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EN

**WASHING-MACHINES  
&  
WASHER-DRYERS**

**with electronic control  
EWM2000EVO  
with sensors**

**"FULL SMD"  
display board**

**Production ZP (Porcia-Italy)**



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## 1 Purpose of this manual

The purpose of this manual is to provide service engineers who are already familiar with the repair procedures for traditional washing machines with information regarding appliances fitted with the EWM 2000EVO electronic control system and produced in Porcia (Italy).

The electronic control system EWM 2000EVO consists of a main electronic board and one control/display board, "Full SMD" version.

The following are described:

- General characteristics
- Control panel and washing programmes
- Technical characteristics
- Guide to the diagnostics

For detailed information concerning hydraulic circuit, structural characteristics of the appliances and accessibility, please refer to Service Manual of washing machines and washer-dryers Series P6000/Nexus (publication no. 599 35 23-17).

## 2 PRECAUTIONS



- **Electrical appliances must be serviced only by qualified Service Engineers.**
- **Always remove the plug from the power socket before touching internal components.**

## 3 GENERAL SPECIFICATIONS

### 3.1 General specifications WM

<b>Programme selector</b>	▪ 16-24 positions with incorporated main switch
<b>Serial port</b>	▪ DAAS-EAP communications protocol up to 38400 baud
<b>Power supply</b>	▪ 220/240V ▪ 50/60 Hz
<b>Type of washing</b>	▪ Jet-system
<b>Rinsing system</b>	▪ Jet-system
<b>Motor</b>	▪ Collector, with tachometric generator
<b>Spin speed</b>	▪ 850 ÷ 1600 g/'
<b>Anti-unbalancing system</b>	▪ FUCS
<b>Water fill</b>	▪ 1 solenoid valve with 1 inlet – 2 or 3 outlets
<b>Detergent drawer</b>	▪ 3 compartments: prewash/stains, wash, conditioners ▪ 4 compartments: prewash/stains, wash, conditioners, bleach
<b>Control of water level in the tub</b>	▪ possibility of three-level pressure switch: 2 anti-boiling and anti-flooding safety levels ▪ electronic/analogic pressure switch
<b>Door safety device</b>	▪ Traditional (with PTC) ▪ Instantaneous
<b>Power of heating element</b>	▪ Up to 1950W
<b>Temperature control</b>	▪ NTC sensor
<b>Audible signalling system</b>	▪ Traditional, included on display board
<b>Sensors</b>	▪ Water level sensor ▪ Turbidity sensor

### 3.2 General specifications WD

<b>Programme selector</b>	▪ 16-24 positions with incorporated main switch
<b>Serial port</b>	▪ DAAS-EAP communications protocol up to 38400 baud
<b>Power supply</b>	▪ 220/240V ▪ 50/60 Hz
<b>Type of washing</b>	▪ Jet-system
<b>Rinsing system</b>	▪ Jet-system
<b>Motor</b>	▪ Collector, with tachometric generator
<b>Spin speed</b>	▪ 850 ÷ 1600 g/'
<b>Anti-unbalancing system</b>	▪ FUCS
<b>Water fill</b>	▪ 1 solenoid valve with 1 inlet – 2 or 3 outlets
<b>Detergent drawer</b>	▪ 3 compartments: prewash/stains, wash, conditioners ▪ 4 compartments: prewash/stains, wash, conditioners, bleach
<b>Control of water level in the tub</b>	▪ possibility of three-level pressure switch: 2 anti-boiling and anti-flooding safety levels ▪ electronic/analogic pressure switch
<b>Door safety device</b>	▪ Traditional (with PTC) ▪ Instantaneous
<b>Power of heating element</b>	▪ Up to 1950W
<b>Power of drying heating element</b>	▪ Up to 1840W (920 + 920) ▪ Only for built-in models up to 1100W (550+550)
<b>Temperature control</b>	▪ NTC sensor
<b>Audible signalling system</b>	▪ Traditional, included on display board
<b>Sensors</b>	▪ Water level sensor ▪ Turbidity sensor

## 4 CONTROL PANEL

The configuration of the control panel depends on the following:

- ↪ Type of control/display board (with or without display)
- ↪ Design of the control panel and position of the programme selector (right or left of the buttons)
- ↪ Number and configuration of the buttons (max. 8)
- ↪ ON/OFF switch: incorporated in the programme selector or with separated button.

<b>Version with left selector and incorporated ON/OFF button</b>	
<b>Sigma</b>	
<b>Version with left selector and button ON/OFF switch</b>	
<b>Alpha</b>	
<b>Ellipse</b>	
<b>Version with right selector and incorporated ON/OFF switch</b>	
<b>Multipanel Built-in</b>	
<b>Version with right selector and incorporated ON/OFF switch</b>	
<b>Sigma/ZK</b>	
<b>Version with left selector and incorporated ON/OFF button</b>	
<b>Jewel</b>	

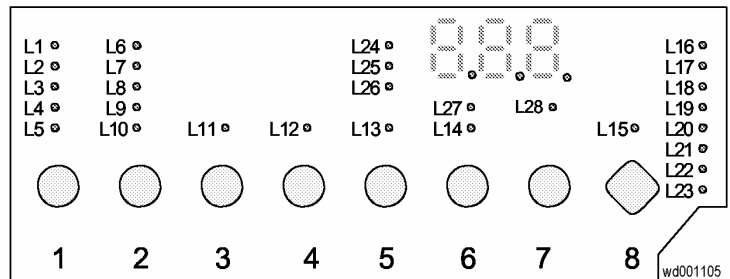
## 4.1 Control/display board

### 4.1.1 Version with display

⇒ 3 digits

⇒ 28 LEDs

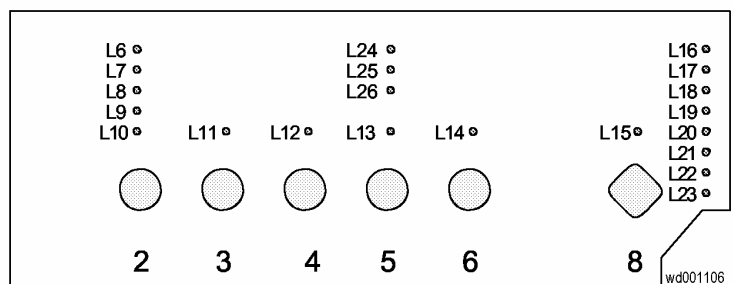
⇒ 8 buttons



### 4.1.2 Version without display

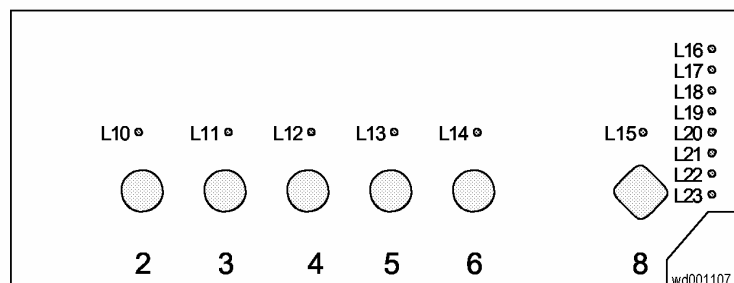
⇒ 21 LEDs

⇒ 6 buttons



⇒ 14 LEDs

⇒ 6 buttons



## 5 WASHING PROGRAMMES

### 5.1 Configuration of programmes

The table below lists the parameters that can be used to define the washing programmes.

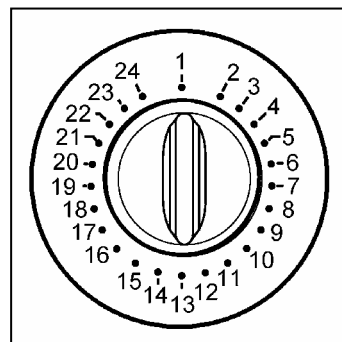
<b>Type of fabric</b>	Cotton/linen, Synthetic fibres, Delicates, Wool, Hand wash, Mini
<b>Special programmes</b>	Soak, Rinses, Spin, Drain, Conditioner
<b>Temperature</b>	Normal, Maximum: initial and maximum temperatures that can be selected for a specific washing programme
<b>Spin</b>	Normal, Minimum, Maximum
<b>Options (Normal / Possible)</b>	Bleaches, Economy (Energy Label), Stains, Short, Very short, Reduced spin, Night cycle, Half-load, Easy-Iron, Rinse Hold, Extra Rinse, Pre-wash, Soak, Sensitive, Vigorous, No spin, Level of Drying
<b>Programme phases</b>	Pre-wash, Wash, Rinses, Spin, End of cycle, Drying

### 5.2 Programme selector

The programme selector determines the type of washing cycle (e.g. water level, drum movement, number of rinses) and the washing temperature to be selected for each type of fabric.

The programme selector may be rotated in either direction (clockwise or counter-clockwise).

The first position is used to cancel the current programme (and, if the main ON/OFF switch is built into the programme selector, to switch the appliance off).



### 5.3 Start/Pause

**Start:** After selecting the programme and the desired options, press this button to start the cycle.

If the delayed-start option has been selected, the count-down will begin, and will be shown on the display. The LED stops flashing and remains lit for the entire duration of the programme.

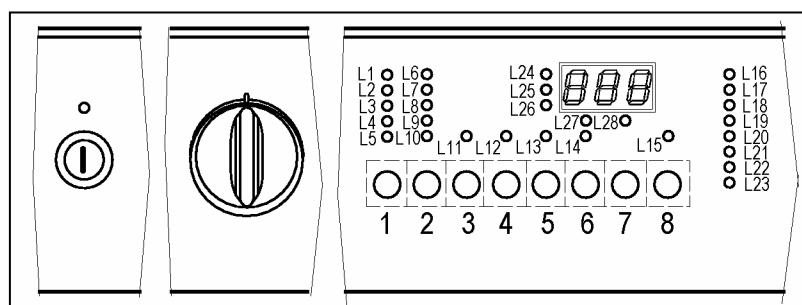
**Pause:** If the button is pressed again, the current programme is interrupted and the display (or the corresponding LED) begins to flash. When in pause mode, the door can be opened, but only if the machine is not performing the heating phase, the water level is not high, and the drum is stationary.

**During the pause,** the following modifications can be made to the programme:

- the OPTIONS for the cycle can be modified before the start of the phase in which they are activated
- the SPIN selection can be modified before the beginning of the final spin.

**To re-start the programme,** press START/PAUSE again.

### 5.4 Button functions



*The washing programmes and the functions for each button vary according to the model, since these are determined by the procedure for the configuration of the appliance.*

## 6 WASHING PROGRAMMES AND OPTIONS

### 6.1 Possible programmes

The wash programmes can be configured to suit personal needs. The table below lists the standard programmes.

Programme		Temperature (°C)	No. of rinses	Final spin (RPM)
Cotton	90	85	3	450/650/850/1000/1200/ 1300/1400/1600
	90E	67	2	
	60	60	3	
	60E	50 (*)(**)	2	
	50	50	3	
	50/40E	44 (*)	2	
	40	42	3	
	30	30		
	Cold (¹)	20		
Synthetics	60	60	3	Max. 900
	60/50E	42 (*)		
	50	50		
	40	40		
	30	30		
	Cold (¹)	20		
Delicate fabrics	40	40	3	450/700
	30	30		
	Cold	20		
Wool	40	40	3	Max. 1000
	30	35		
	Cold	20		
Hand wash	40	40	3	Max. 1000
	30	35		
	Cold	20		
Soak		30/20	----	----
Rinses		----	3	Max. 1600
Rinse for delicate fabrics		----	3	Max. 700
Fabric softener		----	1	Max. 1600
Drain		----	----	----
Spin		----	----	Max. 1600
Delicate spin		----	----	Max. 700
Short cycle		30	2	Max. 1000

The data are indicative

(\*) "energy label" programmes

(¹) in the washer-dryers this is a drying phase

(\*\*)

Programme	Group	Temperature (°C)
-----------	-------	------------------

**COTTON 60 E**

G19/20/22

45÷54

## 6.2 Options of the washing cycle

The selection of the options is to be carried out after switching on the appliance and setting the desired programme with the selector and before pressing the start/pause button.

When the button is pressed, the corresponding LED lights; by pressing it again the LED switches off.

### Possible options according the selected programme

			OPZIONI																	
			Rinse-hold	Night cycle	Pre-wash	Soak	Stains	Daily	Short	Economy	Sensitive	Extra rinse	Bleach	Half-load	Easy iron	Reduced spin speed	No spin	Rinse-hold	Drying	
Compatibility with PROGRAMMES	COTTON	90°C	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
		60°C	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
		50°C	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
		40°C	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
		30°C	X	X	X	X		X	X	X		X	X	X	X	X	X	X	X	
	SYNTHETIC FABRICS	Cold	X	X	X	X		X	X	X		X	X	X	X	X	X	X	X	
		60°C	X	X	X	X	X		X	X	X	X	X			X	X	X	X	
		50°C	X	X	X	X	X		X	X	X	X	X			X	X	X	X	
		40°C	X	X	X	X	X		X	X	X	X	X			X	X	X	X	
		30°C	X	X	X	X			X	X		X	X			X	X	X	X	
	MINI PROGRAMME	30°C	X	X													X	X		
		40°C	X	X	X	X				X			X				X	X		
	DELICATES	30°C	X	X	X	X				X			X				X	X		
		Cold	X	X	X	X				X			X				X	X		
		30°C	X	X													X	X		
	SILK	30°C	X	X									X				X	X		
	WOOL – HAND-WASH	40°C	X	X													X	X		
		30°C	X	X													X	X		
		Cold	X	X													X	X		
	SOAK																			
RINSES			X								X	X	X		X	X	X	X		
CONDITIONER			X												X	X	X	X		
DRAIN																				
SPIN																X				
Compatibility with OPTIONS	RINSE HOLD				X	X	X	X	X	X	X	X	X	X	X	X	X	X		
	NIGHT CYCLE				X	X	X	X	X	X	X	X	X	X	X					
	PRE-WASH			X				X	X	X	X	X		X	X	X	X	X	X	
	SOAK			X				X	X	X	X	X		X	X	X	X	X	X	
	STAINS			X				X	X	X	X	X		X	X	X	X	X	X	
	INTENSIVE			X	X	X	X					X	X	X	X	X	X	X	X	
	DAILY			X	X	X	X					X	X	X	X	X	X	X	X	
	SHORT			X	X	X	X					X	X	X	X	X	X	X	X	
	ECONOMY			X	X	X	X					X	X	X	X	X	X	X	X	
	SENSITIVE			X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
	EXTRA RINSE			X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	
	BLEACH			X				X	X	X	X	X		X	X	X	X	X	X	
	HALF LOAD			X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	
	EASY IRON			X	X	X	X	X	X	X	X		X	X	X		X	X	X	
	REDUCED SPIN SPEED				X	X	X	X	X	X	X	X	X	X	X	X				
	NO SPIN				X	X	X	X	X	X	X	X	X	X	X	X				
	Phases in which selection is possible	PRE-SELECTION			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		PRE-WASH			X			X	X	X	X	X	X	X	X	X	X	X	X	X
		WASH			X			X	X	X	X	X	X	X	X	X	X	X	X	X
		RINSES																X	X	X
SPIN																X	X	X		

## 6.3 Description of options

### 6.3.1 Night cycle

- ↩ All the spin phases are eliminated. **Three** rinses are added to COTTON cycles and **one** rinse is added to SYNTHETICS cycles.
- ↩ The appliance is shut down with water in the drum before the final spin.
- ↩ No buzzer (if appliance is configured with a buzzer).
- ↩ To drain the water, select a drain or spin cycle.

### 6.3.2 Rinse Hold

- ↩ The appliance is shut down with water in the drum before the final spin.
- ↩ To drain the water, select a drain or spin cycle.

### 6.3.3 Prewash

- ↩ A prewash phase is added at the beginning of the cycle. The water is heated to 30°C (or may be cold, if selected).
- ↩ In COTTON and SYNTHETICS cycles, a short spin (pulse spin) is performed before the wash phase.
- ↩ This option is not available in WOOL and HAND WASH cycles.

### 6.3.4 Soak

- ↩ A prewash phase is added (lasting 30', with the same agitation as in the wool cycle) at the beginning of the programme. The water is heated to 30°C (or may be cold, if selected).
- ↩ In COTTON and SYNTHETICS cycles, a short spin (pulse spin) is performed before the wash phase.
- ↩ When combined with the delayed start option, a soak time from 30 minutes to 10 hours can be selected.
- ↩ This option is not available in WOOL and HAND WASH cycles.

### 6.3.5 Stains

- ↩ The motor operates for an extra 5 minutes after the water is heated to 40°C.
- ↩ Water is run through the prewash/stain remover compartment to withdraw the special stain removing product.
- ↩ This option is not available in DELICATE FABRICS, WOOL and HAND WASH cycles.
- ↩ Agitation during washing changes from vigorous to normal.

### 6.3.6 Short (daily)

- ↩ The structure of the wash phase in the COTTON - SYNTHETICS programmes is modified to obtain good performance in a short time (optimized for small loads).

### 6.3.7 Very Short

- ↩ The structure of the COTTON – SYNTHETICS – DELICATE FABRICS programmes is modified to obtain very short time wash times (optimized for small, lightly soiled loads).
- ↩ The number of rinses is reduced (one less rinse).
- ↩ The water level in the other two rinses is increased.

### 6.3.8 Intensive

- ↩ 10 minutes of normal movement are added to the wash phase in the cotton programme.

### 6.3.9 Economy / Energy label

- ↗ The COTTON 40°/50°/60°/90° - SYNTHETICS 50°/60° programmes are modified to reduce energy consumption
- ↗ The wash temperature in the 90°/60°/50° programmes is reduced; the temperature in the 40° programme is increased by 4°.
- ↗ The duration of the wash phase is increased

### 6.3.10 Sensitive

- ↗ One rinse is added to the COTTON – SYNTHETICS cycles
- ↗ During cotton cycles, agitation is reduced from vigorous to normal
- ↗ Intermediate spin phases are eliminated except for the final two, whose speed is reduced.

### 6.3.11 Extra rinse

- ↗ Two rinses are added to COTTON cycles, and one rinse is added to SYNTHETICS – DELICATE cycles.
- ↗ Intermediate spin phases are eliminated except for the final two, which are reduced to 450 rpm.

### 6.3.12 Bleach

- ↗ Ducts water through the bleach compartment at the beginning of the first rinse in COTTON cycles.
- ↗ Pre-wash possible only where there are three solenoids.
- ↗ In models with two solenoids the bleach is not compatible with the pre-wash option.

### 6.3.13 “Half load” button

- ↗ Eliminates a rinse in the COTTONS programmes.

### 6.3.14 Easy-Iron

- **In COTTON programmes:**
  - ↗ Adds three rinses.
  - ↗ Eliminates the intermediate spins.
  - ↗ Performs an impulse spin phase.
  - ↗ Adds an “untangling” phase after the spin cycle.
- **In SYNTHETICS cycles:**
  - ↗ Reduces the heating temperature in 50/60° cycles to 40°C.
  - ↗ Increases the washing time.
  - ↗ Prolongs the cooling phase at the end of the washing phase.
  - ↗ Adds one rinse without spin cycle.
  - ↗ Adds an “untangling” phase after the impulse spin cycle.

### 6.3.15 Reduced spin speed

- ↗ Reduces the speed of **all** spins as shown in the table

Maximum spin speed (rpm)	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
Reduction for COTTON (rpm)	450	450	450	450	500	550	600	650	700	750	800
Reduction for ALL OTHER CYCLES (rpm)	450	450	450	450	450	450	450	450	450	450	450

### 6.3.16 No spin

- ↗ Eliminates **all** the spin phases.
- ↗ If selected, three rinses are added in the COTTON cycle and one in the SYNTHETICS cycle.

### 6.3.17 Modifying the spin speed

- ↵ Reduces the speed of **all** spin cycles.
- ↵ The last position can be used for NO SPIN, RINSE-HOLD.
- ↵ If the NO-SPIN option is selected, three rinses are added in the COTTON cycle, and one in the SYNTHETICS cycle.

### 6.3.18 Time reduction (Quick)

- ↵ Modifies the structure of the COTTON - SYNTHETICS– DELICATES programmes to obtain washing time very short (optimization for small or lightly-soiled loads).
- ↵ Reduces the no. of rinses (one rinse less).
- ↵ Increases the water level of the other two rinses.
- ↵ Corresponds to the SHORT- VERY SHORT cycles on the basis of the configuration of the appliance.

### 6.3.19 Temperature adjustment

- ↵ Used to select the washing temperature compatibly with the limit temperature for the cycle.
- ↵ Can be used during the cycle selection phase: the temperature can be modified only if the heating phase has not started (in pause mode).

### 6.3.20 Delayed-start time

#### • Models with digit

- ↵ It is possible to select, during the programme selection phase, a delayed start from 30 minutes up to 23 hours (↵ 30' ↵ 60' ↵ 90' ↵ 2h ↵ 3h... ↵ 23h ↵ 0h).
- ↵ During the delay phase, the time decreases every hour up to 2h, then by 30minutes.
- ↵ To start the cycle immediately, after the delay time began: press the Start/Pause button, cancel the delay time by pressing the relative button and press Start/Pause again.

#### • Models with led

- ↵ Insert a pause before the start of the programme, the delay time is indicated by the corresponding LEDs.
- ↵ To start the cycle immediately, after the delay time began: press the Start/Pause button, cancel the delay time by pressing the relative button and press Start/Pause again.

### 6.3.21 Exclude buzzer

- ↵ The buzzer can be deactivated by pressing a combination of two buttons simultaneously for 5 seconds. This option depends on the configuration; as a result, the buttons may vary according to the model.
- ↵ If the buzzer is deactivated, the appliance will emit no acoustic signal during selection or at the end of the cycle; however, the alarm signalling system remains operative.

### 6.3.22 Electronic drying (WASHER-DRYERS – certain models only)

Three different degrees of drying can be selected for COTTON, and one for SYNTHETIC fabrics:

- ↵ Extra-dry (cotton only)
- ↵ Cupboard-dry (cotton and synthetics)
- ↵ Iron dry (cotton only)

The appliance automatically calculates the drying time is selected using “fuzzy logic”.

The drying phase may be performed automatically (i.e. without interrupting the programme) if selected together with a washing programme, or as a separate programme.

### 6.3.23 “Drying time” button

This button is used to select the drying time for COTTON and SYNTHETIC cycles. The time increases by 5 minutes each time it is pressed (from 10 to 130 minutes).

The drying function can be selected for automatic execution after a washing cycle, or as a separate programme.

### 6.3.24 Variation of rinses when options are selected

			Number of rinses for the options				
			Normal	Sensitive	Super rinse	Night cycle Easy-iron No spin	Night cycle Easy-iron No spin Super rinse
PROGRAMMES	COTTON	Very short	2	3	4	5	6
		Short	3	4	5	6	7
		Eco	3	4	5	6	7
		Eco	2	3	4	5	6
		Normal	3	4	5	6	7
	SYNTHETICS	Very short	2	3	3	3	5
		Short	3	4	4	4	5
		Eco	3	4	4	4	5
		Normal	3	4	4	4	5
	DELICATE	Very short	2	-	3	-	-
		Normal	3	-	4	-	-
		Normal	3	-	-	-	-
	WOOL	Normal	3	-	-	-	-
	HAND WASH	Normal	2	3	3	3	5

**N.B.:** The HALF-LOAD option subtracts one rinse from all COTTON programmes, except for the VERY SHORT programme.

- The turbidity sensor adds one rinse if there is too much foam or the water is very dirty in all programmes, except COTTON ECO and SYNTHETICS.

## 6.4 Display (certain models only)

The following information appears on the display:

- ☞ **Three flashing dashes** appear when the appliance is switched on
- ☞ **The duration of the wash programme** appears when the programme is selected. This value is the amount of time necessary for washing the maximum load of laundry for the type of programme selected. When the programme is started, the time counts down minute by minute.
- ☞ **The end of the programme** is indicated by a "0" (when the door can be opened)
- ☞ **Delayed start** is selected using the relative button. When the START/PAUSE button is pressed, the time begins counting down and decreases an hour at a time until 2 hrs remain, then the decrease is 30 minutes at a time.
- ⇒ **An alarm code** indicates a malfunction has occurred.

## 6.5 LEDs

These LEDs display different information depending on machine configuration; the end-of-cycle LED is present on all models.

Type of LED	Function
<b>Prewash</b>	This LED lights up if the selected programme includes a prewash, and lights up during the prewash phase when the programme is executed.
<b>Wash</b>	This LED lights up if the selected programme includes a wash phase, and lights up during the wash phase when the programme is executed.
<b>Prewash/Wash</b>	This LED lights up if the selected programme includes a prewash or wash phase, and lights up during the prewash or wash phase when the programme is executed.
<b>Rinse</b>	This LED lights up if the selected programme includes rinses, and lights up during the rinses when the programme is executed.
<b>Spin</b>	This LED lights up if the selected programme includes a spin phase, and lights up during the spin phase when the programme is executed.
<b>Drain</b>	This LED lights up if the selected programme includes a drain phase, and lights up during the drain phase when the programme is executed.
<b>Extra rinse</b>	This LED lights up when the programme is chosen if an extra rinse has been selected/stored (if an extra rinse is included in the programme), and lights up during the extra rinse when the programme is executed.
<b>Rinse Hold</b>	This LED lights up when the programme is chosen if this option has been selected, and at the end of the cycle when the machine stops with water in the drum.
<b>Cycle in progress</b>	This LED lights up while the programme is being executed.
<b>End of cycle</b>	This LED lights up at the end of the cycle; it is also used to signal alarms.
<b>Filter clogged</b>	This LED lights up at the end of the cycle if the drain filter is clogged.
<b>Detergent overload</b>	This LED lights up at the end of the cycle if too much detergent has been used.
<b>ON/OFF</b>	This LED lights up when the machine is switched on.
<b>Door</b>	<ul style="list-style-type: none"> <li>↗ This LED lights up when the door is locked by the safety system.</li> <li>↘ The LED switches off when the door is no longer locked.</li> <li>↗ The LED flashes while the door is being unlocked (which occurs masterly on models with a safety system equipped with a PTC)</li> </ul>
<b>Time until end of cycle</b>	This LED lights up when the display is showing the time remaining until the end of the cycle.
<b>Drying</b>	Lights during selection if the programme includes a drying cycle and during the cycle when it is in progress.

## 7 WASHING PROGRAMMES

### 7.1 Base programmes for Cotton / Linen: cold-30-40-60-90° (without options)

N.°	Phase	Description		Drain pump	Recirc. pump	Deterg Dispens.	Motor Movement			CYCLE				
							Rpm	Movem.	Pause	90°	60°/60°	40°	30°	*
1	Pre-wash	Calibration	Level	ON	OFF		No Movement			DRAIN				
2		Flow Calibration	Level	OFF	OFF	PW	No Movement			WATER FILL				
3		Water softener Maintenance	Time	OFF	OFF	PW	55	4	12	1 min.				
4		Water fill	Level	OFF	OFF	PW	No Movement			COT_FIRST_PW_LEV				
5		Maintenance & Refill	Time	OFF	ON (35/15)	PW	55	4	12	4 min. COT_FIRST_PW_LEV				
6		Heating	Temperature	OFF	ON (35/15)	PW	55	4	12	Heating up to 30° or 20 min. 20° o 20 min.				
7		Maintenance	Time	OFF	ON (35/15)	PW	55	4	12	4 min.				
8		Drain	Time	ON	OFF		No Movement			Empty Elect. + 14 Sec.				
9		Spin	Time	ON	OFF		IMP C0			4,5 min. with AS control				
10	Wash	Calibration	Level	ON	OFF		No Movement			DRAIN				
11		Flow Calibration	Level	OFF	OFF	PW	No Movement			WATER FILL				
12		Maintenance & Refill	Time	OFF	OFF	PW	55	4	12	1 min.				
13		Water fill	Level	OFF	OFF	W	No Movement			COT_FIRST_W_LEV				
14		Maintenance & Refill	Time	OFF	ON (35/15)	W	55	8	8	5 min. COT_SEC_NW_LEV				
15		Heating	Temperature or time	OFF	ON (35/15)	W	55	8	8	40° o 40 min.		40° o 80 min.		
16		Heating	Temperature or time	OFF	ON (35/15)	W	55	8	8	60° o 40 min.	60° o 80 min.	41° o 10 min.	30° o 80 min.	20° o 80 min.
17		Heating	Temperature or time	OFF	OFF	W	55	8	8	85° o 40 min.				
18		Maintenance heating	Temperature or time	OFF	ON (35/15)	W	55/10/3 if 90° 55/8/8					41° o 5 min.	T° ref. 5 min.	T° ref. 5 min.
19		Maintenance	Time	OFF	ON (35/15)	W	55/10/3 if 90° 55/8/8			2 min.	5 min.			
20		Maintenance	Time	OFF	ON (35/15)	W	55	8	8	3 min.				
21		Heating	Temperature or time	OFF	OFF	W	55	10	3		5 min.			
22		Heating	Temperature or time	OFF	ON (35/15)	W	55	8	8		60° o 20 min.			
23		Heating	Temperature or time	OFF	ON (35/15)	W	55	10	3			41° o 10 min.	30° o 20 min.	
24		Maintenance	Time	OFF	ON (35/15)	W	55	10	3	5 min.	10 min.	10 min.	10 min.	10 min.
25		Maintenance	Time	OFF	OFF	W	55	8	8			5 min.	5 min.	5 min.
26		Maintenance	Time	OFF	ON (35/15)	W	55	10	3			10 min.	10 min.	10 min.
27		Maintenance	Time	OFF	OFF	W	55	8	8		10 min.	15 min.	15 min.	15 min.
28		Maintenance	Time	OFF	OFF	W	55	10	3	10 min.				
29		Maintenance	Time	OFF	OFF	W	55	8	8	4 litres				
30		Cooling	Time	OFF	OFF	W	55	4	12	2 min.				
31		Calibration of Turbidity Sensor	Time	ON	OFF		No Movement			20 sec.				
32		Drain	Time	ON	OFF		No Movement			Empty Elect. + 14 Sec.				
33		Spin	Time	ON	OFF		IMP 6			5 min. with AS control				
34		Drain	Time	ON	OFF		No Movement			20 sec.				

(The data are indicative)

PW = Pre-wash W = Wash AS = Anti-foam control  
 Only if cycle begins with a wash phase and not with a prewash

## 7.2 Rinses of Cotton programmes

N.º	PHASE	Description		Drain pump	Recirc. Pump	Deterg. Disp	Motor movement			CYCLE
							Rpm	Movem.	Pause	
35	1st Rinse	Water fill	Level	OFF	ON (35/15)	BL	No movement			COT_FIRST_N_R_TURB_LEV
36		Maintenance & Refill	Time	OFF	ON (35/15)	W	55	8	8	5 min. COT_REF_N_R_LEV
37		Turbidity measurement	Time	OFF	OFF		No movement			6 sec.
38		Drain	Level	ON	OFF		No movement			Empty Elect.+ 14 sec.
39		Spin	Time	ON	OFF		IMP_C6			5 min. with AS control
40	2nd Rinse	Water fill	Level	OFF	OFF	W	55	8	8	Qt
41		Maintenance	Time	OFF	ON(35/15)		No movement			20 sec.
42		Wait	Time	OFF	OFF		No movement			30 sec
43		Water fill	Level	OFF	ON (35/15)	W	No movement			COT_INT_N_R_LEV
44		Maintenance & Refill	Time	OFF	ON (35/15)	W	55	8	8	5 min. COT_REF_N_R_LEV
45	Last rinse (softener)	Drain	Level	ON	OFF		No movement			Empty Elect.+ 14 sec
46		Spin	Time	ON	OFF		IMP_C6			5 min. with AS control
47		Water fill	Level	OFF	OFF	SF	55	8	8	DRY_COND_LEV
48		Water fill	Level	OFF	ON	SF	No movement			COT_LAST_N_R_LEV
48		Maintenance	Time	OFF	OFF		55	8	8	30 sec.
50		Water fill	Level	OFF	OFF	SF	No movement o			Qsf (4 Litres)
51		Maintenance & Refill	Time	OFF	ON (35/15)	W	55	8	8	8 min. COT_REF_N_R_LEV
52		Drain	Level	ON	OFF		No movement			Empty Elect.+ 14 sec
53		Spin		ON	OFF		IMPCF_AC			9 min. with AS control

(The data are indicative)

BL = Bleach SF = Softener W = Wash AS = Anti-foam

■ Only if Turbidity sensor is featured

■ Only for Washing machines- Washer-dryers (WD)

### 7.3 Cotton / Linen programmes: 90 Eco, 40-60 “energy label” (without options)

N.°	PHASE	Description		Drain pump	Recirc. Pump	Deterg. Disp	Motor movement			CYCLE		
							Rpm	Movem.	Pause	90	60/50	40
1	Prewash	Calibration	Level	ON	OFF		No movem			DRAIN		
2		Flow calibration	Level	OFF	OFF	PW	No movem			WATER FILL		
3		Maintenance water softener	Time	OFF	OFF	PW	55	4	12	1 min.		
4		Water fill	Level	OFF	OFF	PW	No movem			COT_FIRST_PW_LEV		
5		Maintenance & Refill	Time	OFF	ON (35/15)	PW	55	4	12	4 min. COT_SEC_PW_LEV		
6		Heating	Temperature or time	OFF	ON (35/15)	PW	55	4	12	30° o 20 min.		
7		Maintenance	Time	OFF	ON (35/15)	PW	55	4	12	4 min.		
8		Drain	Time	ON	OFF		No movem			Empty Elect. + 14 sec.		
9		Spin	Time	ON	OFF		IMP C0			4,5 min. with AS control		
10	Wash	Calibration	Level	ON	OFF		No movem			DRAIN		
11		Flow calibration	Level	OFF	OFF	PW	No movem			WATER FILL		
12		Maintenance water softener	Time	OFF	OFF	PW	55	4	12	1 min.		
13		Water fill	Level	OFF	OFF	W	No movem			COT_FIRST_W_LEV		
14		Maintenance & Refill	Time	OFF	OFF	W	40	10	3	5 min. COT_FIRST_W_LEV		
15		Maintenance	Time	OFF	ON (35/15)	W	40	10	3	1 min.		
16		Maintenance	Time	OFF	OFF	W	No movem			22 sec.		
17		Maintenance & Refill	Time	OFF	OFF	W	40	10	3	1 min. COT_SEC_EW_LEV		
18		Maintenance	Time	OFF	ON (35/15)	W	40	10	3	1 min.		
19		Maintenance	Time	OFF	OFF	W	No movem			22 sec.		
20		Heating	Temperature or time	OFF	OFF	W	55	8	8	67°÷ 64° o 80 min.	54°÷45° o 20 min.	44°÷ 40° o 80 min.
22		Maintenance heating	Temperature or time	OFF	ON (35/15)	W	55	10	3	T° ref. 5 min.		
23		Maintenance heating	Temperature or time	OFF	OFF	W	55	10	3			T° ref. 30 min.
24		Maintenance	Time	OFF	ON (35/15)	W	55	10	3		15 min.	
25		Maintenance	Time	OFF	OFF	W	No movem				30 sec.	30 sec.
26		Heating	Temperature or time	OFF	OFF	W	55/10/3 40° 55/8/8			67°÷ 64° 20 min.	54°÷45° 2 min.	44°÷ 40° 20 min.
27		Maintenance	Time	OFF	ON (35/15)	W	55	8	8			10 min.
28		Maintenance	Time	OFF	ON (35/15)	W	55	10	3	25 min.	20 min.	20 min.
29		Maintenance	Time	OFF	ON (35/15)	W	55	8	8			5 min.
30		Maintenance	Time	OFF	OFF	W	55	8	8	5 min.	5 min.	
31		Maintenance	Time	OFF	ON (35/15)	W	55	10	3		15 min.	
32		Drain	Time	ON	OFF		No movem			Empty Elect. + 14 sec.		
33		Spin	Time	ON	OFF		IMP_6			5 min. with AS control		
34		Drain	Time	ON	OFF		No movem			20 sec.		

(The data are indicative)

PW= Prewash W = Wash AS = Anti-foam

Only if cycle begins with a wash phase and not with a prewash

The temperature depends on the water Min.45° Max.53°

## 7.4 Rinses of Cotton / Linen programmes: 90 Eco, 40-60 “energy label” (without options)

### 7.4.1 For programmes with two rinses

N.°	PHASE	Description		Drain pump	Recirc. Pump	Deterg. Disp	Motor Movement			CYCLE
							Rpm	Movem.	Pause	
35	1 <sup>st</sup> Rinse	Water fill	Level	OFF	ON(35/15)	BL	No movem			COT_FIRST_E_R_LEV
36		Maintenance & Refill	Time	OFF	ON (35/15)	W	55	8	8	8 min. COT_REF_E_R_LEV
37		Drain	Level	ON	OFF		No movem			Empty Elect.+ 14 sec.
38		Spin		ON	OFF		IMP_6			5 min. with AS control
39	Last rinse (softener)	Water fill	Level	OFF	OFF	SF	55	8	8	DRY_COND_LEV
40		Water fill	Level	OFF	OFF	SF	No movem			COT_LAST_E_R_LEV
41		Maintenance	Time	OFF	OFF		55	8	8	30 sec.
42		Water fill	Level	OFF	OFF	SF	55	8	8	Qsf (4 Litres)
43		Maintenance & Refill	Time	OFF	ON (35/15)	W	55/8/8 G20 55/4/12 per G22			4 min.for G20 and G22 COT_REF_E_R_LEV
44		Maintenance & Refill	Time	OFF	ON (35/15)	W	55	8	8	4 min.for G20 and G22 COT_REF_E_R_LEV
45		Drain	Time	ON	OFF		No movem			Empty Elect.+ 14 sec
46		Spin	Time	ON	OFF		IMPCF_AC			5 min. with AS control

(The data are indicative) BL = Bleach SF = Softener W = Wash AS = Anti-foam control

Only for WD

### 7.4.2 For programmes with three rinses

N.°	PHASE	Description		Drain pump	Recirc. Pump	Deterg. Disp	Motor Movement			CYCLE
							Rpm	Movem.	Pause	
35	1 <sup>st</sup> Rinse	Water fill	Level	OFF	ON(35/15)	BL	No movem			COT_FIRST_E_R_LEV
36		Maintenance & Refill	Time	OFF	ON (35/15)	W	55	8	8	5 min. COT_REF_E_R_LEV
37		Drain	Level	ON	OFF		No movem			Empty Elect.+ 14 sec.
38		Spin		ON	OFF		IMP_6			5 min. with AS control
39	2 <sup>nd</sup> Rinse	Water fill	Level	OFF	OFF	W	No movem			COT_INT_E_R_LEV
40		Maintenance & Refill	Time	OFF	ON (35/15)	W	55	8	8	5 min. COT_REF_E_R_LEV
41		Drain	Level	ON	OFF		No movem			Empty Elect.+ 14 sec.
42		Spin		ON	OFF		IMP_6			5 min. with AS control
43	Last rinse (softener)	Water fill	Level	OFF	OFF	SF	55	8	8	DRY_CON_LEV
44		Water fill	Level	OFF	OFF	SF	No movem			COT_LAST_E_R_LEV
45		Maintenance	Time	OFF	OFF		55	8	8	30 sec.
46		Water fill	Level	OFF	OFF	SF	55	8	8	Qsf (4 Litres)
47		Maintenance & Refill	Time	OFF	ON (35/15)	W	55/8/8 per G19 e G20 55/4/12 per G22			8 min. per G19 4 min. per G20 e G22 COT_REF_E_R_LEV
48		Maintenance & Refill	Time	OFF	ON (35/15)	W	55	8	8	4 min. per G20 e G22 COT_REF_E_R_LEV
49		Drain	Level	ON	OFF		No movem			Empty Elect.+ 14 sec
50		Spin		ON	OFF		IMPCF_AC			9 min. with AS control

(The data are indicative) BL = Bleach SF = Softener W = Wash AS = Anti-foam control

Only for WD

## 7.5 Synthetics programmes: cold – 30 – 40 – 50 – 60° (without options)

N.°	PHASE	Description		Drain pump	Recirc. Pump	Deterg. Disp	Motor Movement			CYCLE				
							Rpm	Movem.	Pause	60	50	40	30	*
1	PREWASH	Calibration	Level	ON	OFF		No movem			Drain				
2		Flow calibration	Level	OFF	OFF	PW	No movem			Water fill				
3		Maintenance water softener	Time	OFF	OFF	PW	55	4	12	1 min.				
4		Water fill	Level	OFF	OFF	PW	No movem			COT_FIRST_PW_LEV				
5		Maintenance & Refill	Time	OFF	ON (35/15)	PW	55	4	12	4 min. COT_FIRST_PW_LEV				
6		Heating	Temperature	OFF	ON (35/15)	PW	55	4	12	Heating up to 30°				20°
7		Maintenance	Time	OFF	ON (35/15)	PW	55	4	12	10 min.				
8		Drain	Time	ON	OFF		No movem			Empty Elect.+ 14 sec.				
9		Spin	Time	ON	OFF		IMP C0			4,5 min. with AS control				
10	WASH	Calibration	Level	ON	OFF		No movem			Drain				
11		Flow calibration	Level	OFF	OFF	PW	No movem			Water fill				
12		Maintenance water softener	Time	OFF	OFF	PW	55	4	15	1 min.				
13		Water fill	Level	OFF	OFF	W	No movem			SYN_FIRST_W_LEV				
14		Maintenance & Refill	Time	OFF	ON (35/15)	W	55	8	8	3 min. SYN_SEC_NW_LEV				
15		Heating	Temperature	OFF	ON (35/15)	W	55	10	3	60°	50°	40°	30°	20°
16		Maintenance	Time	OFF	ON (35/15)	W	55	10	3	10 min.	10 min.	10 min.	10 min.	20° ref 10 min.
17		Heating	Time	OFF	ON (35/15)	W	55	10	3	60°	50°	40°	30°	
18		Maintenance	Time	OFF	OFF	W	55	10	3	15 min.	15 min.	15 min.	15 min.	
19		Maintenance	Temperature	OFF	ON (35/15)	W	55	10	3					15 min.
20		Cooling	Time	OFF	OFF	W	55	8	8	Qc (4 Litres)				
21		Maintenance	Time	OFF	ON (35/15)	W	55	4	12	2 min.				
22		Drain	Time	ON	OFF		No movem			Empty Elect.+ 14 sec.				
23		Drain	Time	ON	OFF		55	4	12	1 min.				
24		Wait	Time	ON	OFF		No movem			6 sec.				

(The data are indicative)

PW = Prewash BL = Bleach SF = Softener W = Wash AS = Anti-foam

## 7.6 Rinses of synthetics programmes

N.°	PHASE	Description		Drain pump	Recirc. Pump	Deterg. Disp	Motor Movement			CYCLE				
							Rpm	Movem.	Pause	90	60	40	30	*
25	1st Rinse	Water fill	Level	OFF	OFF	BL	No movem			SYN_FIRST_R_LEV				
26		Wait	Time	OFF	OFF		No movem			6 sec.				
27		Maintenance & Refill	Time	OFF	ON (35/15)	W	55	10	3	3 min. SYN_REF_R_LEV				
28		Drain	Time	ON	OFF		No movem			Empty Elect.+ 14 sec.				
29		Drain	Time	ON	OFF		55	4	12	1 min.				
30		Wait	Time	ON	OFF		No movem			6 sec.				
31	2nd Rinse	Water fill	Level	OFF	OFF	BL	No movem			SYN_INT_R_LEV				
32		Wait	Time	OFF	OFF		No movem			6 sec.				
33		Maintenance & Refill	Time	OFF	ON (35/15)	W	55	10	3	3 min. SYN_REF_R_LEV				
34		Drain	Time	ON	OFF		No movem			Empty Elect.+ 14 sec.				
35		Maintenance	Time	ON	OFF		55	4	12	1 min.				
36		Wait	Time	ON	OFF		No movem			6 sec.				
37		Spin	Time	ON	OFF		IMP_C0			4,5 min. with AS control				
38	Last rinse (softener)	Wait	Time	ON	OFF		No movem			6 sec.				
39		Water fill	Level	OFF	OFF	SF	No movem			SYN_LAST_R_LEV				
40		Maintenance	Time	OFF	OFF		55	10	3	30 sec				
41		Water fill	Level	OFF	OFF	SF	55	10	3	Qsf (4 Litres)				
42		Maintenance & Refill	Time	OFF	ON (35/15)	W	55	10	3	5 min. SYN_REF_R_LEV				
43		Drain	Time	ON	OFF		No movem			Empty Elect.+ 14 sec.				
44		Spin	Time	ON	OFF		IMP_5			4 min. with AS control				

(The data are indicative)

PW= Prewash BL = Bleach SF = Softener W = Wash AS = Anti-foam

## 7.7 Programmes for delicate fabrics: cold – 30° - 40° (without options)

N.°	PHASE	Description		Drain pump	Recirc. Pump	Deterg. Disp	Motor Movement			CYCLE		
							Rpm	Movem.	Pause	40	30	*
1	PREWASH	Calibration	Level	ON	OFF		No movem			Drain		
2		Flow calibration	Level	OFF	OFF	PW	No movem			Water fill		
3		Maintenance water softener	Time	OFF	OFF	PW	55	4	12	1 min.		
4		Water fill	Level	OFF	OFF	PW	No movem			COT_FIRST_PW_LV		
5		Maintenance & Refill	Time	OFF	ON (35/15)	PW	55	4	12	4 min. COT_FIRST_PW_LV		
6		Heating	Temperature	OFF	ON (35/15)	PW	55	4	12	Heating up to 30°		20°
7		Maintenance	Time	OFF	ON (35/15)	PW	55	4	12	4 min.		
8		Drain	Time	ON	OFF		No movem			Empty + 14 sec.		
9	WASH	Calibration	Level	ON	OFF		No movem			Drain		
10		Water fill	Level	OFF	OFF	W	No movem			SOFT_LEV		
11		Maintenance & Refill	Time	OFF	OFF	W	55	4	12	1 min.		
12		Water fill	Level	OFF	OFF	W	No movem			DEL_FIRST_W_LEV		
13		Maintenance & Refill	Time	OFF	ON (35/15)	W	55	4	12	1 min. DEL_SEC_W_LEV		
14		Heating	Temperature	OFF	ON (35/15)	W	55	4	12	40°	30°	20°
15		Maintenance	Time	OFF	ON (35/15)	W	55	4	12	T° ref. 10 min.	T° ref. 10 min.	T° ref. 10 min.
16		Heating	Time	OFF	ON (35/15)	W	55	4	12	40°	30°	20°
17		Maintenance	Time	OFF	ON (35/15)	W	55	4	12	10 min.	10 min.	10 min.
18		Drain	Time	ON	OFF		No movem			Empty + 14 sec.		
19	Rinses	1st Rinse	Water fill	Level	OFF	OFF	BL	No movem			DEL_FIRST_R_LEV	
20			Maintenance & Refill	Time	OFF	ON (60/20)	W	55	4	12	3 min. DEL_REF_R_LEV	
21			Drain	Time	ON	OFF		No movem			Empty + 14 sec.	
22			Drain	Time	ON	OFF		55	4	12	1 min.	
23		2nd Rinse	Water fill	Level	OFF	OFF	W	No movem			DEL_INT_R_LEV	
24			Maintenance & Refill	Time	OFF	ON (60/20)	W	55	4	12	3 min. DEL_REF_R_LEV	
25			Drain	Time	ON	OFF		No movem			Empty + 14 sec.	
26			Drain	Time	ON	OFF		55	4	12	1 min.	
27		Last rinse (softener)	Water fill	Level	OFF	OFF	SF	No movem			DEL_LAST_R_LEV	
28			Maintenance	Time	OFF	OFF		55	4	12	30 sec.	
29			Water fill	Level	OFF	OFF	SF	55	4	12	Qsf (4 Litres)	
30			Maintenance & Refill	Time	OFF	ON (60/20)	W	55	4	12	3 min. DEL_REF_R_LEV	
31			Drain	Time	ON	OFF		No movem			Empty + 14 S	
32			Drain	Time	ON	OFF		55	4	12	1 min.	
33			Spin	Time	ON	OFF		DF			700Rpm	

(The data are indicative)

PW= Prewash BL = Bleach SF = Softener W = Wash

## 7.8 Wool programmes: cold – 30° - 40°

N.°	PHASE	Description		Drain pump	Recirc. Pump	Deterg. Disp	Motor Movement			CYCLES		
							Rpm	Movem.	Pause	40	30	*
1	WASH	Calibration	Level	ON	OFF		No movem			Drain		
2		Water fill	Level	OFF	OFF	W	No movem			SOFT_LEV		
3		Maintenance & Refill	Time	OFF	OFF	W	35	1	40	1 min.		
4		Water fill	Level	OFF	OFF	W	No movem			WOOL_FIRST_W_LEV		
5		Maintenance & Refill	Time	OFF	ON (35/15)	W	35	1	40	1 min. WOOL_SEC_W_LEV		
6		Heating	Temperature	OFF	ON (35/15)	W	35	1	40	38°	33°	20°
7		Maintenance	Time	OFF	ON (35/15)	W	35	1	40	T° ref. 15 min.	T° ref. 15 min.	T° ref. 15 min.
8		Drain	Time	ON	OFF		No movem			Empty + 14 sec.		
9	Rinses	1st Rinse	Water fill	Level	OFF	OFF	W	No movem			WOOL_INT_R_LEV	
10			Maintenance & Refill	Time	OFF	ON (60/20)	W	35	1	40	3 min. WOOL_REF_R_LEV	
11			Drain	Time	ON	OFF		No movem			Empty + 14 sec.	
12			Drain	Time	ON	OFF		55	4	12	1 min.	
13		2nd Rinse	Water fill	Level	OFF	OFF	W	No movem			WOOL_INT_R_LEV	
14			Maintenance & Refill	Time	OFF	ON (60/20)	W	35	1	40	3 min. WOOL_REF_R_LEV	
15			Drain	Time	ON	OFF		No movem			Empty + 14 sec.	
16			Drain	Time	ON	OFF		55	4	12	1 min.	
17		Last rinse (softener)	Water fill	Level	OFF	OFF	SF	No movem			WOOL_LAST_R_LEV	
18			Maintenance	Time	OFF	OFF		35	1	40	30 sec.	
19			Water fill	Level	OFF	OFF	SF	35	1	40	Qsf (4 Litres)	
20			Maintenance & Refill	Time	OFF	ON (60/20)	W	35	1	40	5 min. WOOL_REF_R_LEV	
21			Drain	Time	ON	OFF		No movem			Empty + 14 sec.	
22			Spin	Time	ON	OFF		WF			1000 rpm	

(The data are indicative)  
SF = Softener W = Wash

## 7.9 Hand wash programmes: cold – 30° - 40°

N.°	PHASE	Description		Drain pump	Recirc. Pump	Deterg. Disp	Motor movement			CYCLE		
							Rpm	Movem.	Pause	40	30	*
1	WASH	Calibration	Level	ON	OFF		No movem			Drain		
2		Water fill	Level	OFF	OFF	W	No movem			SOFT_LEV		
3		Maintenance & Refill	Time	OFF	OFF	W	35	1	57	1 min.		
4		Water fill	Level	OFF	OFF	W	No movem			HAND_FIRST_W_LEV		
5		Maintenance & Refill	Time	OFF	ON (35/15)	W	35	1	57	1 min. HAND_SEC_W_LEV		
6		Heating	Temperature	OFF	ON (35/15)	W	35	1	57	38°	33°	20°
7		Maintenance	Time	OFF	ON (35/15)	W	35	1	57	T° ref 15 min.	T° ref 15 min.	T° ref 15 min.
8		Drain	Time	ON	OFF		No movem			Empty + 14 sec.		
9	Rinses	1st Rinse	Water fill	Level	OFF	OFF	No movem	No movem			HAND_INT_R_LEV	
10			Maintenance & Refill	Time	OFF	ON (60/20)	W	35	1	57	3 min. HAND_REF_R_LEV	
11			Drain	Time	ON	OFF		No movem			Empty + 14 sec.	
12			Drain	Time	ON	OFF		55	4	12	1 min.	
13		2nd Rinse	Water fill	Level	OFF	OFF	W	No movem			HAND_INT_R_LEV	
14			Maintenance & Refill	Time	OFF	ON (60/20)	W	35	1	57	3 min. HAND_REF_R_LEV	
15			Drain	Time	ON	OFF		No movem			Empty + 14 sec.	
16			Drain	Time	ON	OFF		55	4	12	1 min.	
17		Last rinse (softener)	Water fill	Level	OFF	OFF	SF	No movem			HAND_LAST_R_LEV	
18			Maintenance	Time	OFF	OFF		35	1	40	30 sec.	
19			Water fill	Level	OFF	OFF	SF	35	1	40	Qsf (4 Litres)	
20			Maintenance & Refill	Time	OFF	ON (60/20)	W	35	1	57	5 min. HAND_REF_R_LEV	
21			Drain	Time	ON	OFF		No movem			Empty + 14 sec.	
22			Spin	Time	ON	OFF		WF			1000 rpm	

(The data are indicative)

SF = Softener W = Wash

## 8 DRYING PROGRAMMES

### 8.1 Drying programme for cotton

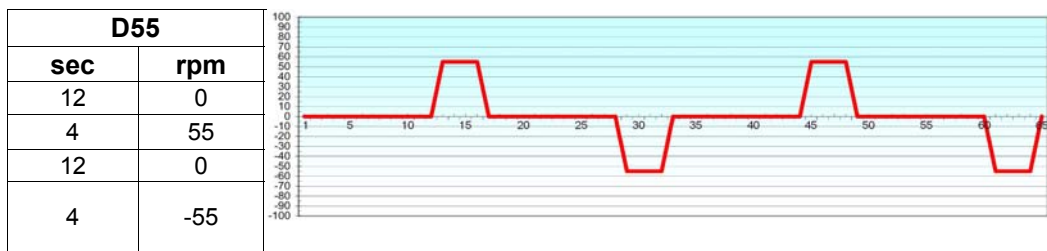
DRYING COTTON (full power)													
N.°	PHASE	Function		Drain pump	Fan	LEV	Compart.	Motor			Temperature	Time	Notes
								Rpm	Movem.	Pause			
1	DRYING	Drain	Level	ON	OFF			No movem					
2		Water fill control	Level	OFF	OFF	(10.0)	COND	55	8	8			
3		Unrolling	Time	ON	OFF			55	8	8		10 min.	Only when autodrying is enabled
4		Cooling	Temperature	ON	ON		COND	55	8	8	35°	20 min.	Not for time-controlled drying
5		Calculation of drying time	Time	ON	ON		COND	55	8	8	COT_DRY_TEMP		
6		Timer-controlled drying	Time	OFF	ON			55	57	3	COT_DRY_TEMP	10 min.	Only when drying time >20 min.
7		Timer-controlled drying	Time	ON	ON		COND	55	57	3	COT_DRY_TEMP	Max. 130 min	
8		Cooling	Time	ON	ON		COND	55	57	3	35°	10 min.	

### 8.2 Drying programme for synthetics

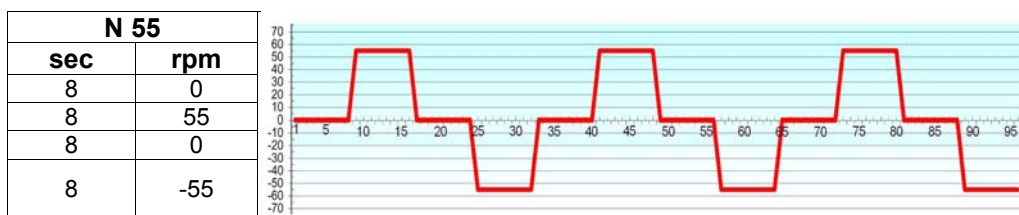
DRYING SYNTHETICS (half power)													
N.°	PHASE	Function		Drain pump	Fan	LEV	Compart.	Motor			Temperature	Time	Notes
								Rpm	Movem.	Pause			
1	DRYING	Drain	Level	ON	OFF			No movem					
2		Water fill control	Level	OFF	OFF	(10.0)	COND	55	8	8			
3		Unrolling	Time	ON	OFF			55	8	8		10 min.	Only when autodrying is enabled
4		Cooling	Temperature	ON	ON		COND	55	8	8	35°	20 min.	Not for time-controlled drying
5		Calculation of drying time	Time	ON	ON		COND	55	8	8	SYN_DRY_TEMP		
6		Timer-controlled drying	Time	OFF	ON			55	57	3	SYN_DRY_TEMP	10 min.	Only when drying time >20 min.
7		Timer-controlled drying	Time	ON	ON		COND	55	57	3	SYN_DRY_TEMP	Max. 130 min	
8		Cooling	Time	ON	ON		COND	55	57	3	35°	10 min.	

### 8.3 Drum movements at low speed and during spin

#### 8.3.1 D55 Delicate movement



#### 8.3.2 N55 Normal movement



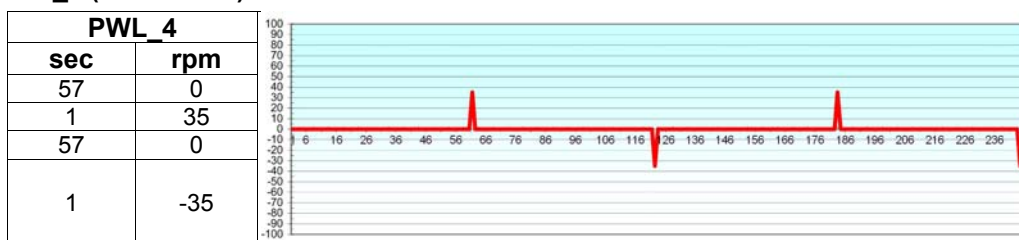
#### 8.3.3 E55 Vigorous movement



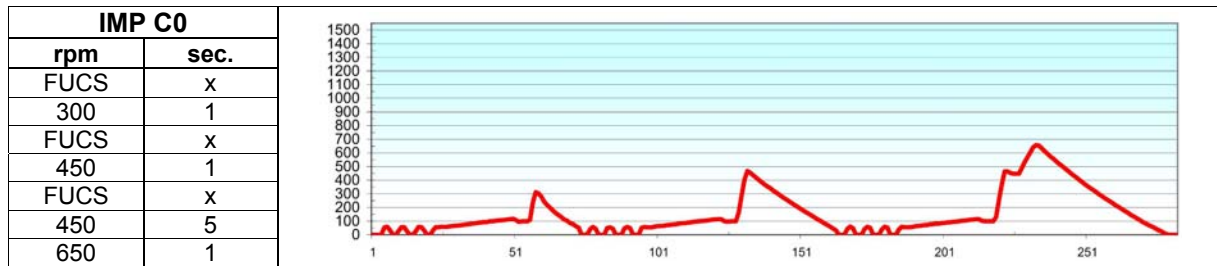
#### 8.3.4 PWL\_1 (wool) Delicate movement



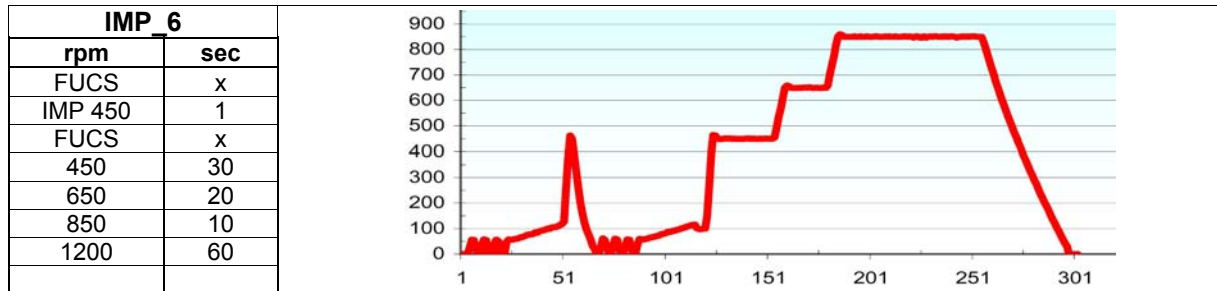
#### 8.3.5 PWL\_4 (hand wash) Delicate movement



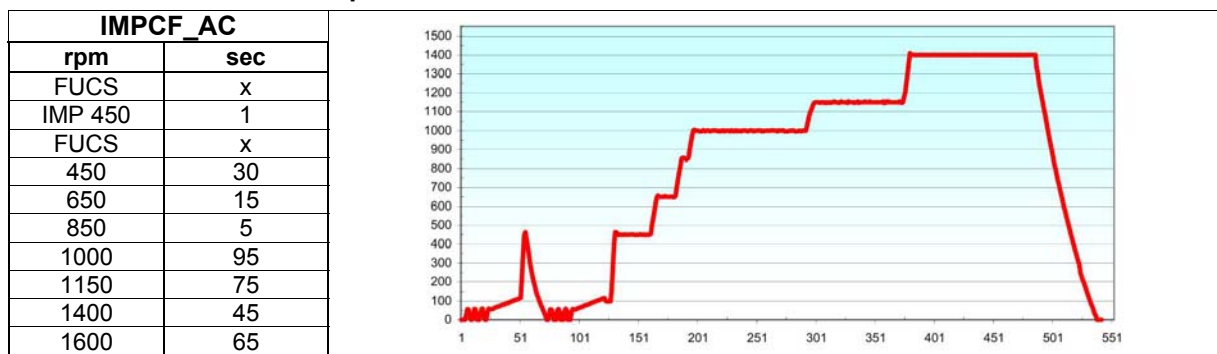
### 8.3.6 Cotton/Linen, Synthetics – Intermediate Synthetics Prewash Spin



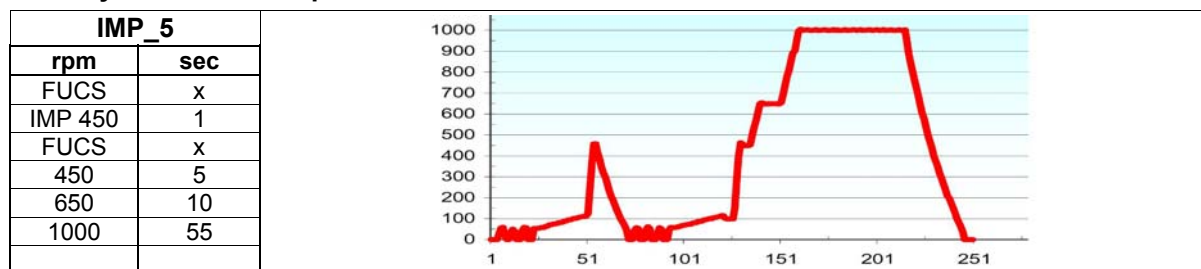
### 8.3.7 Cotton/Linen, Intermediate Cotton/Linen Wash Spin



### 8.3.8 Cotton/Linen Final Spin

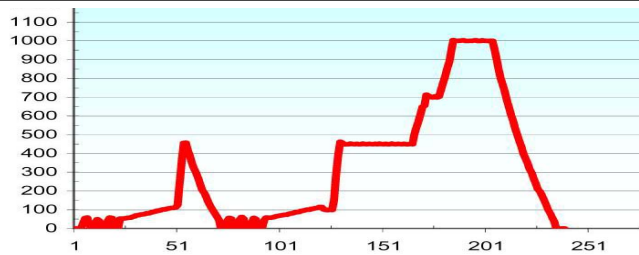


### 8.3.9 Synthetics Final Spin



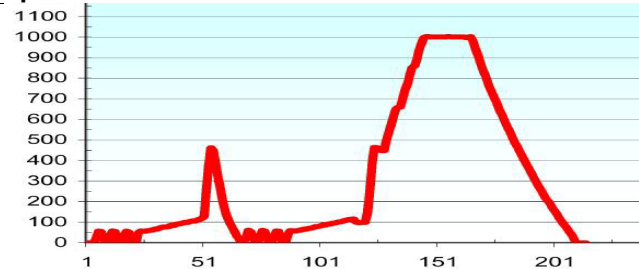
### 8.3.10 Delicates Final Spin

DF	
rpm	sec
FUCS	x
IMP 450	1
FUCS	x
450	35
700	5
1000	20



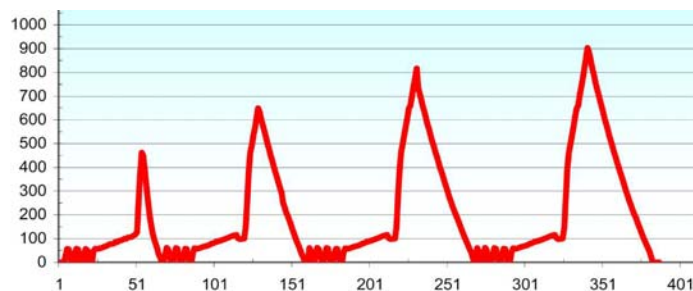
### 8.3.11 Hand Wash and Wool Final Spin

WF	
rpm	sec
FUCS	x
IMP 450	1
FUCS	x
450	5
650	1
850	1
1000	20



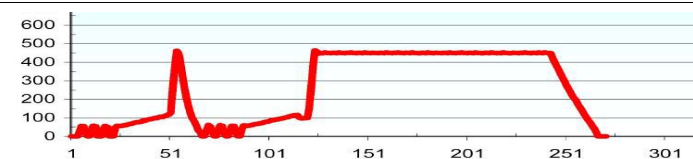
### 8.3.12 Easy iron Impulse Cycle EI

EASY_IRON_IMP	
rpm	sec
FUCS	x
450	1
FUCS	x
650	1
FUCS	x
800	1
FUCS	x
900	1



### 8.3.13 Intermediate Spin for Cotton/Linen Super-rinse option

CSR	
rpm	sec
FUCS	x
IMP 450	1
FUCS	x
450	90



### 8.3.14 Movement during drying phase

DRY_MOV	
rpm	sec.
3	0
55	57
3	0
-55	57



Notes:

**FUCS** antiunbalance function before spin phase

**x** variable duration

• in the diagrams the speed is indicated as rotations per minute and the time in seconds.

## 8.4 Control of water level in tub

The water fill is carried out in three ways:

- ↺ **level fill**: is controlled by the electronic pressure switch level
- ↺ **time fill**: the duration is calculated by the electronic to fill the set quantity
- ↺ **level fill and time fill combined**

The different levels are determined by the model configuration and depend on the type of tub used.

### Level water fill

Type	Description of fill type	G 19		G 20		G 22	
	Levels for COTTON/LINEN	P(*)	V(*)	P(*)	V(*)	P(*)	V(*)
COT_FIRST_PW_LEV	Water fill first prewash level	100	65	100	65	100	65
COT_SEC_PW_LEV	Water fill refill prewash level	100	65	100	65	100	65
COT_SEC_EW_LEV	Water fill second wash level for ECONOMY cycle	70	50	65	45	60	40
COT_SEC_NW_LEV	Water fill second wash level for NORMAL cycle	80	50	80	50	70	55
COT_FIRST_N_R_LEV	Water fill first rinse for NORMAL cycle	100	20	160	20	160	20
COT_FIRST_W_LEV	Water fill first wash level	90	50	85	40	85	45
COT_INT_E_R_LEV	Water fill intermediate rinses for ECO cycle	140	20	105	20	105	20
COT_INT_N_R_LEV	Water fill intermediate rinses for NORMAL cycle	105	20	105	20	100	20
COT_REF_E_R_LEV	Water fill refill for ECO cycle	60	20	60	20	60	20
COT_REF_N_R_LEV	Water fill refill for NORMAL cycle	60	20	60	20	65	20
COT_LAST_N_R_LEV	Water fill last rinse for NORMAL cycle	120	20	120	20	130	30
COT_LAST_E_R_LEV	Water fill last rinse for ECO cycle	135	20	120	20	120	20
SOFT_LEV	Water fill	40	15	40	15	40	15
	Levels for SYNTHETICS						
SYN_FIRST_W_LEV	Water fill first level SYNTHETICS	80	20	90	20	90	20
SYN_SEC_W_LEV	Water fill second level SYNTHETICS	75	50	85	50	70	45
SYN_FIRST_R_LEV	Water fill first rinse SYNTHETICS	130	20	135	20	145	20
SYN_INT_R_LEV	Water fill intermediate rinses	130	20	135	20	145	20
SYN_LAST_R_LEV	Water fill first level last rinse	90	20	100	20	100	20
SYN_REF_R_LEV	Rinse level refill	60	20	60	20	60	20
	Levels for DELICATES						
DEL_FIRST_W_LEV	Water fill first level DELICATES	155	120	155	120	130	170
DEL_SEC_W_LEV	Water fill second level DELICATES	150	100	150	100	120	70
DEL_FIRST_R_LEV	Water fill first level first rinse	170	120	170	120	160	120
DEL_INT_R_LEV	Water fill first level intermediate rinses	170	120	170	120	160	120
DEL_LAST_R_LEV	Water fill first level last rinse	145	120	145	120	130	120
DEL_REF_R_LEV	Water fill rinse level refill	150	120	150	120	150	100
	Levels for HAND WASH						
HAND_FIRST_W_LEV	Water fill first level HAND WASH	140	100	140	100	125	100
HAND_SEC_W_LEV	Water fill second level HAND WASH	130	100	130	100	120	100
HAND_INT_R_LEV	Water fill first level intermediate rinses	180	100	180	100	160	100
HAND_LAST_R_LEV	Water fill first level last rinse	150	100	150	100	130	100
HAND_REF_R_LEV	Water fill rinse level refill	130	100	130	100	120	100
	Levels for WOOL						
WOOL_FIRST_W_LEV	Water fill first level	140	90	140	90	120	90
WOOL_SEC_W_LEV	Water fill second level	130	90	130	90	115	90
WOOL_INT_R_LEV	Water fill first level intermediate rinses	170	120	180	100	150	100
WOOL_LAST_R_LEV	Water fill first level last rinse	145	120	150	100	115	100
WOOL_REF_R_LEV	Water fill rinse level	150	120	120	90	120	100
DRY_COND_LEV	Water fill	110	85	110	85	110	85

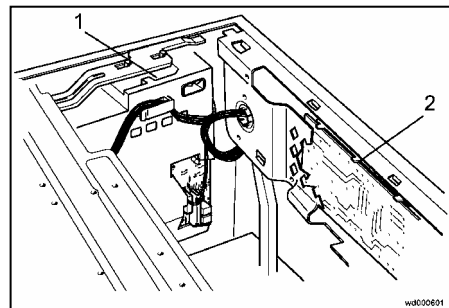
(The data are indicative)

(\*)The measures are expressed in mm.

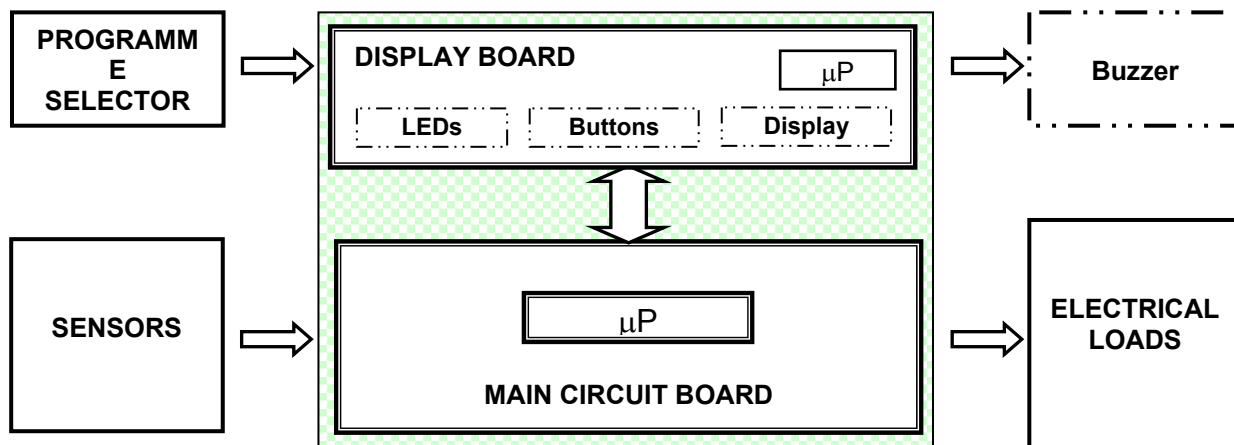
## 9 TECHNICAL CHARACTERISTICS

### 9.1 EWM2000EVO Electronic control

The EWM2000 EVO electronic control consists of a main PCB (1) and a control/display board (2).

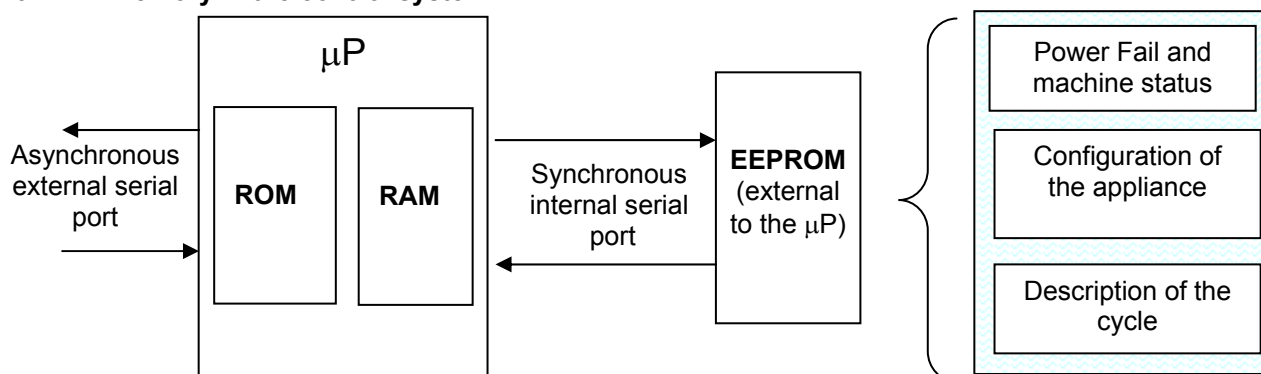


#### 9.1.1 Functions of the circuit board



- ⇒ The circuit board receives signals relative to the cycle settings via the control/display board. The buttons, the LEDs and the display are also mounted on this board which is connected to the programme selector.
- ⇒ The board also powers all the electrical components (solenoid valves, washing motor, drain pump, heating element, door interlock).
- ⇒ The board controls the temperature of the washing water via an NTC sensor, as well as the speed of rotation of the washing pump according to the signal received from the tachometric generator.
- ⇒ It checks the water level in tub via the level pressure switch and the safety one.
- ⇒ It controls the water level via the flow meter.
- ⇒ It checks the turbidity of the rinse water via the turbidity sensor.

#### 9.1.2 Memory in the control system



The main circuit board features an EEPROM memory (external to the microprocessor) which stores in memory data relative to the configuration, description of the cycle, cycle status in case of a power failure, and any alarm conditions.

The configuration data (entered in the factory using a computer with a DAAS interface) determine the functionalities of the appliance (number and type of programmes, options, LEDs etc).

The overall structure of the microprocessor memory on the main PCB is subdivided into three sections:

**ROM** This area of memory contains the software with the general instructions that control the operation of the appliance, such as those of the electrical components and alarms. The ROM is set up by the manufacturer of the microprocessor, and cannot be modified.

**RAM** This part of memory contains all the variables used during the execution of the wash programme, which are written in dynamic format. The RAM can be read using a DAAS interface.

**EEPROM** This area of memory contains:

⇒ the data necessary to restart the appliance in case of a power failure.

⇒ the parameters for the wash cycle, such as water fill level, speed and type of motor movement, and the temperature during the various phases of the wash cycle. Once written, this data is protected and, normally, can be read only using a DAAS interface.

⇒ data relative to the configuration of the appliance, such as the speed of the final spin phase, the volume of the tub, the type of washing system, etc. This data may be entered either via a DAAS interface or via the control/display board.

## 9.2 Analogic pressure switch (electronic)

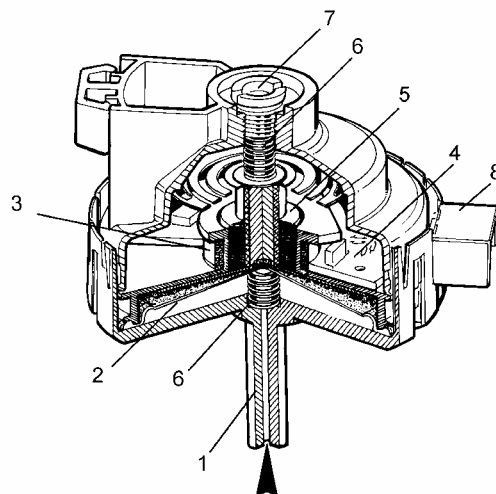
The electronic pressure switch is an analogic device that controls the water level in the tub. It is directly connected to the main electronic PCB.

1. air inlet hose
2. diaphragm
3. coil
4. electronic circuit (oscillator)
5. core
6. spring
7. calibration screw
8. connector

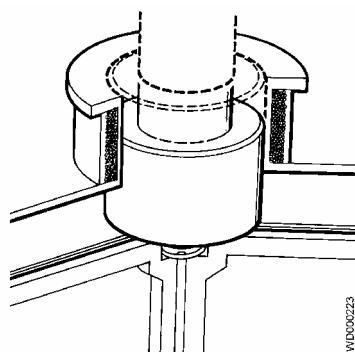
The pressure switch is connected by a hose to the pressure chamber.

When the tub is filled with water, the pressure created inside the hydraulic circuit expands the diaphragm. This in turn modifies the position of the core inside the coil, thus changing the inductance and the frequency of the oscillating circuit.

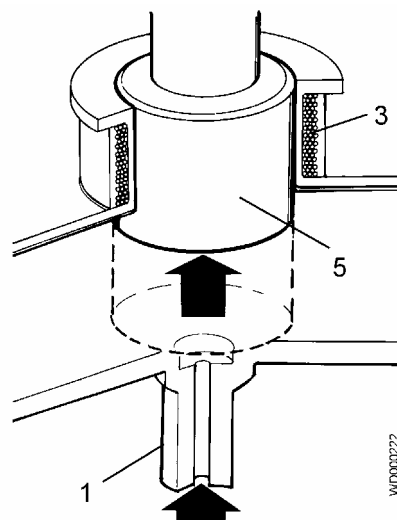
The electronic PCB, according to the frequency, recognizes the quantity of the water in the tub.



WD000220

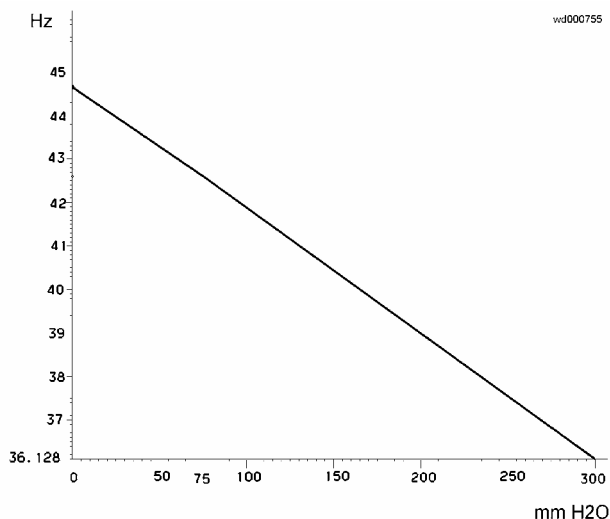


WD000223



WD000222

### Frequency variation according to pressure.

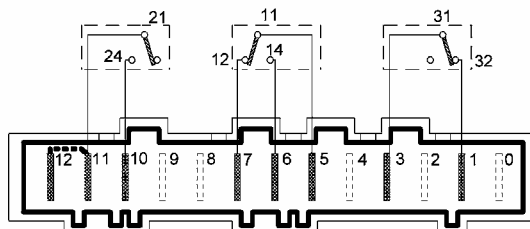
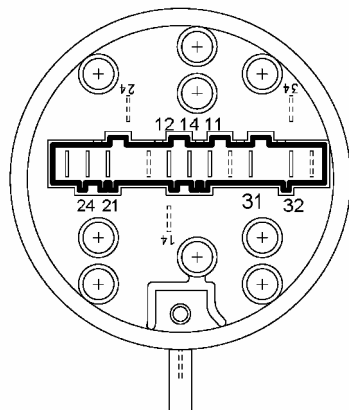


wd000755

### 9.3 Pressure switch

Control of the water level is performed by a two or three-level pressure switch which functions as follows:

- contact **11-14**: anti-boiling safety level
- contact **21-24**: anti-boiling safety level
- contact **31-32**: anti-overflow safety level (*not all models*)



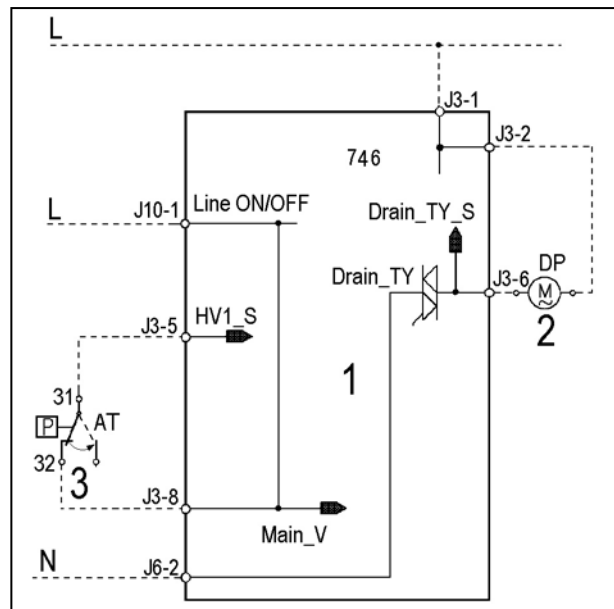
#### 9.3.1 Pressure switch settings

	Full (mm)	Refill (mm)
Anti-boiling level	$50 \pm 3$	$30 \pm 3$
Anti-boiling level	$50 \pm 3$	$30 \pm 3$
Anti- overflow level	$390 \pm 15$	$240 \pm 50$

## 9.4 Anti-flooding device

1. *PCB*
8. *Drain pump*
9. *Anti-overflow pressure switch*

*HV1\_S Anti-overflow level sensor*



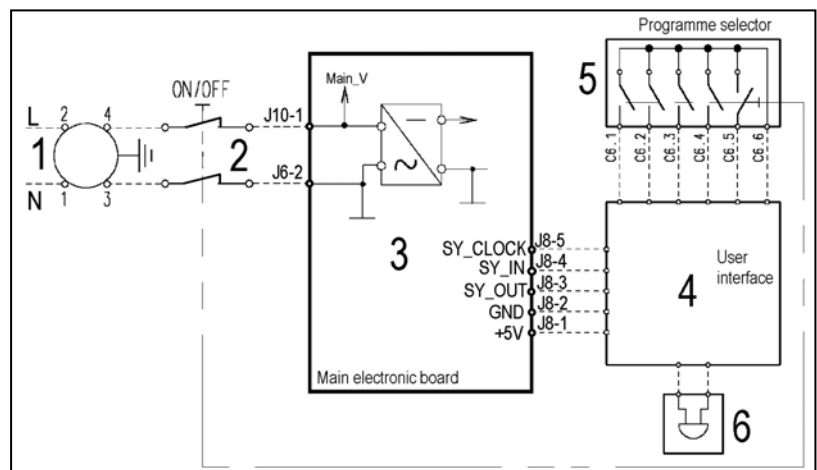
The third pressure switch level (if featured) is used as an anti-overflow safety device: if the pressure switch contact should open in the FULL position, the PCB actions the drain pump until the pressure switch returns to the EMPTY position.

## 9.5 Power supply and programme selection

The main board (3) is powered by the interference suppressor (1) and by the closure of the contacts of the main switch (2). The affected connectors are J6-2 (neutral) and J10-1 (line).

The control/display board (4) is powered at 5V by the main board: through the programme selector (5) it is possible to select the programme. The selection of the options / start is performed through the board buttons (4).

The buzzer (if featured) (6) is powered by the display board.

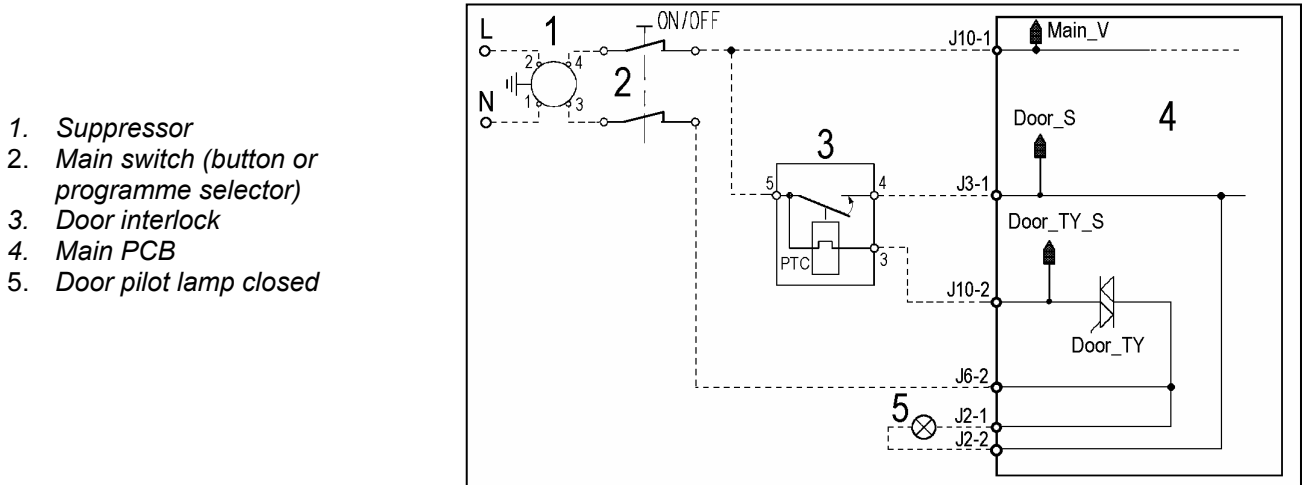


## 9.6 Door interlock

There are two types of door interlock:

- voltmetric with PTC: it is always necessary to wait from 1 to 3 minutes before opening the door.
- instantaneous: the door can be opened as soon as the cycle ends.

### 9.6.1 Voltmetric interlock with PTC



- **Operating principle**

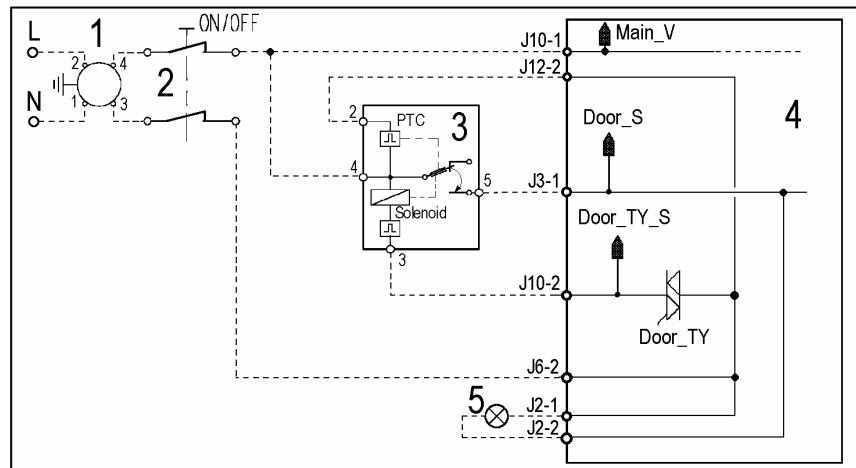
- When the washing programme is started by pressing the START/PAUSE button, the bi-metal PTC (contacts 3-5) is powered by the triac on the PCB (J10-2 connector): after 2 – 4 seconds, this closes the switch (5-4) which powers the electrical components of the appliance (only if the door is closed).
- The door interlock prevents aperture of the door while the appliance is in operation.
- At the end of the washing programme, the PCB disconnects the interlock from the power supply, but the door remains locked for 1 to 2 minutes (PTC cooling time).

### Door locked” pilot lamp

- ↪ Certain models feature a pilot lamp which lights to indicate that the door is locked. This pilot lamp switches off when the door can be opened.

## 9.6.2 Instantaneous door interlock

1. Suppressor
2. Main switch (button or programme selector)
3. Door interlock
4. Main PCB
5. Door pilot lamp off



- **Operating principle**

- ↪ When the appliance is switched on, the ON/OFF switch closes and the bi-metal PTC (contact 4-2) is powered; the door, however, is not locked.
- ↪ When the programme starts (START/PAUSE button), the PCB transmits a 20 msec voltage signal to contacts 4-3 of the solenoid valve (J10-2 connector of the board) (at least 6 seconds must elapse after switching on); this signal locks the door and, at the same time, closes the main switch (contacts 4-5) which powers all the components in the appliance.
- At the end of the programme, the PCB transmits two 20 msec signals (at an interval of 200 msec).
  - the first signal does not release the door.
  - the second signal (which is transmitted only if the system functions correctly) releases the door interlock and at the same time the contacts of the main switch are opened.

- **Conditions necessary for door release**

- ↪ Before transmitting the door release signals, the main PCB checks for the following conditions:
  - the drum must be stationary (no signal from the tachometric generator)
  - the water level must not be higher than the lower edge of the door
  - the temperature of the water must not exceed 50°C.

- **Automatic release device**

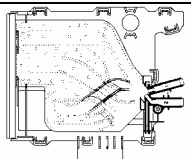
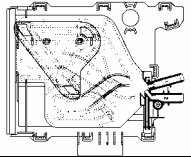
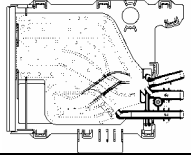
- ↪ In the event of a power failure, if the appliance is switched off, or if the solenoid should malfunction, the bi-metal PTC cools over a period of 1 to 4 minutes, and then releases the door.

- **“Door locked” pilot lamp**

- ↪ Certain models feature a pilot lamp which lights to indicate that the door is locked. This pilot lamp switches off when the door can be opened.

## 9.7 Detergent dispenser

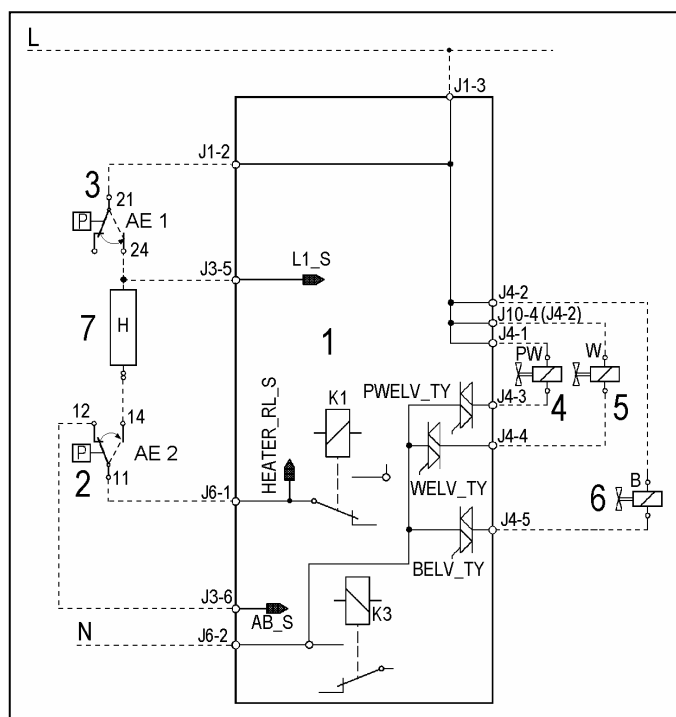
The EWM 2000 EVO can control different types of dispensers:

Type	Detergent dispenser		No. of solenoid valves
3 compartments		Pre-wash/Stains – Wash – Conditioner (pre-wash and stain are in alternance)	2
4 compartments		Pre-wash/Stains – Wash – Bleach - Conditioner (the pre-wash/stain and conditioner compartment are linked together with a "intersection")	2
		Pre-wash/Stains – Wash – Bleach - Conditioner (pre-wash and stain are in alternance)	3

## 9.8 Water fill system

The solenoid valves are powered by the main board through two or three triacs. The state of the pressure switch (full-empty) is detected over two sensing lines.

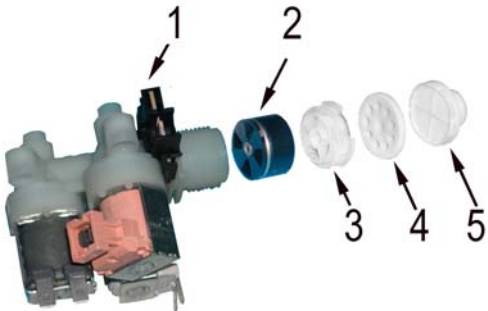


1. Main board
2. Anti-boiling level switch AE2
3. Anti-boiling level switch AE1
4. Solenoid valve for prewash
5. Solenoid valve for wash
6. Solenoid valve for bleach (on some models)
7. Heating element



## 9.9 Flow meter

Some models of solenoid valves have a built-in flow sensor which measures the quantity of water in litres that is loaded into the appliance.

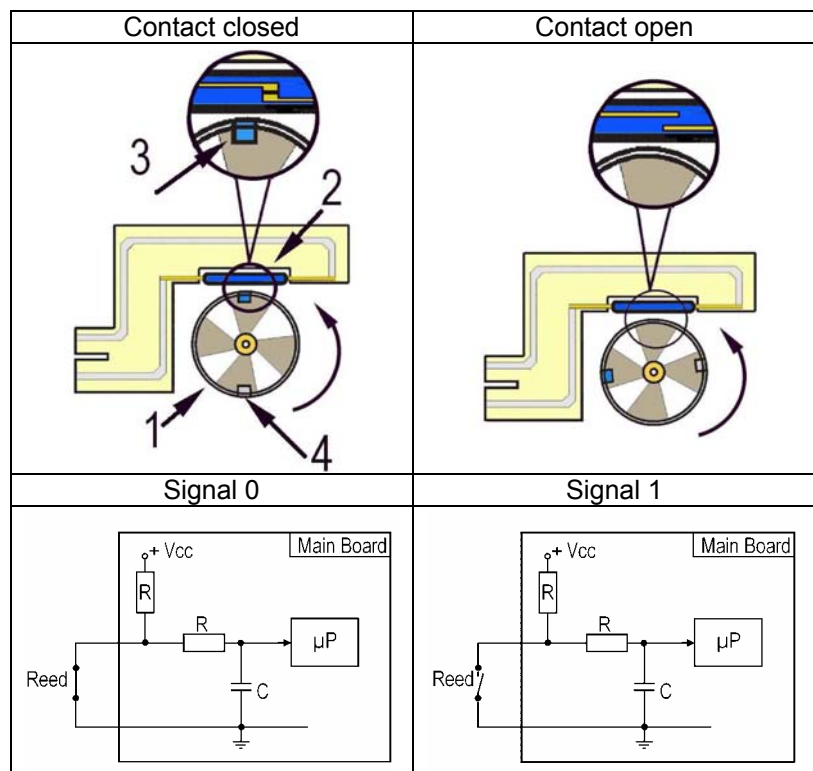
If the sensor malfunctions, the water level is controlled by the analogue pressure switch.

Solenoid valve – exploded view	Main board	Turbine
		
1-Circuit board 2-Turbine 3-Deflector 4-Diffuser 5-Double filter	6- Reed switch	7-Magnet

### 9.9.1 Operating principle of flow meter

The main components of the flow sensor are:

1. Turbine (with magnet and counterweight mounted on the outside)
2. Reed switch (normally open)
3. Magnet
4. Counterweight



Water entering the solenoid valve rotates the turbine (1) and magnet (3), which passes in front of the reed switch (2), thus closing it. As this contact opens and closes, it generates pulses at a frequency that is a function of water flow.

The turbine completes 230 revolutions for each litre of water. The operating range of the flow sensor is 0.2-10 bar.

Using the signal it receives, the microprocessor can calculate the number of litres of water passing through the solenoid valve.

## Mechanical jamming of solenoid valve

The solenoid valve may jam open without being actuated (which will cause flooding if the pressure switch controlling the water level does not trip). If this occurs, the electronic control system (which continuously monitors the flow sensor) will lock the door, start the drain pump and display an alarm.

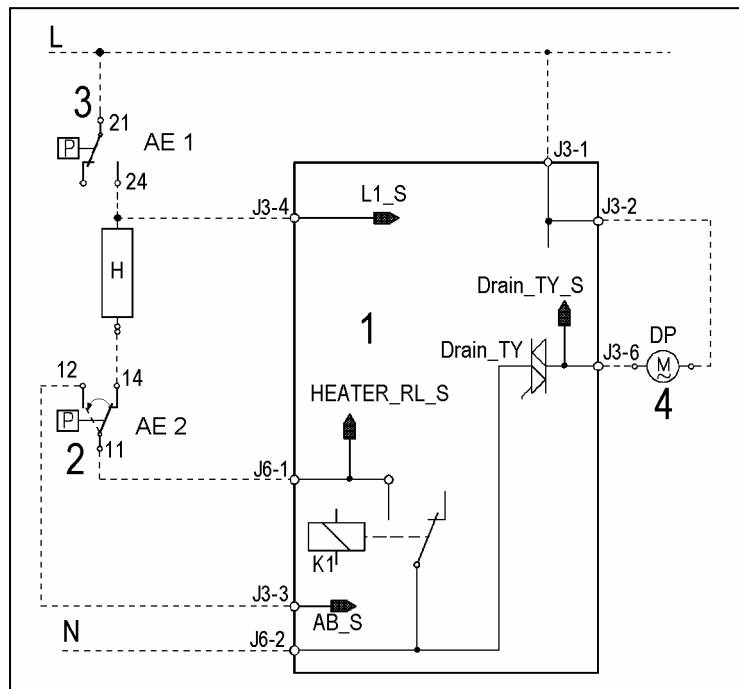
## Low water pressure

If the flow sensor does not generate a signal during water fill even though power is being applied to the solenoid valve, the cause of this condition may be a closed water tap or clogged filter on the solenoid valve (with consequent low water pressure). If this occurs, a warning will be displayed and the cycle will continue for five minutes, after which time an alarm will be signalled.

The solenoid valve controlling residual condensed water operates during the drying phase on washer-dryers. The alarm is deactivated because the amount of water fill is very small.

## 9.10 Drain pump

1. PCB
2. Anti-boiling pressure switch AE2
3. Anti-boiling pressure switch AE1
4. Drain pump

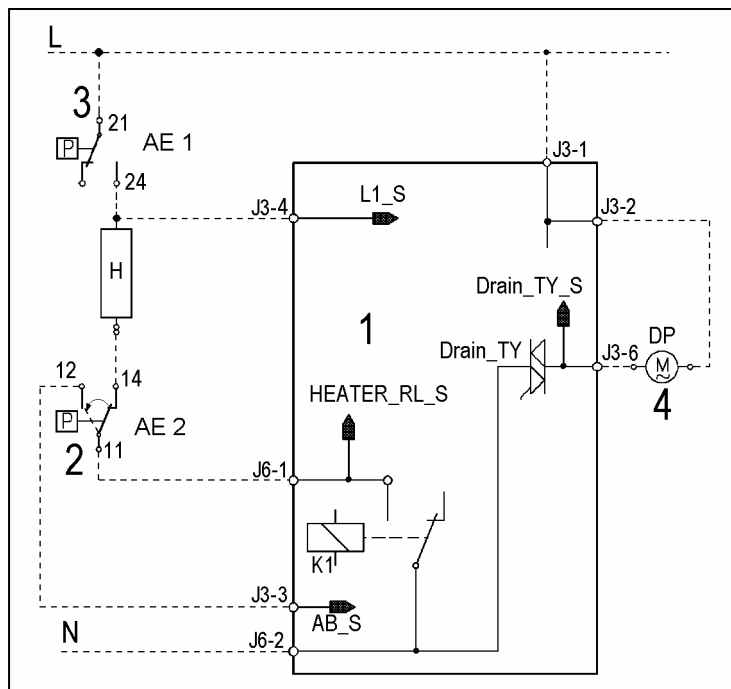


The PCB powers the drain pump via a triac as follows:

- ↳ for a pre-determined period.
- ↳ until the anti-boiling pressure switch closes on EMPTY, after which the pump is actioned for a brief period or passes to the subsequent phase.

## 9.11 Drain pump

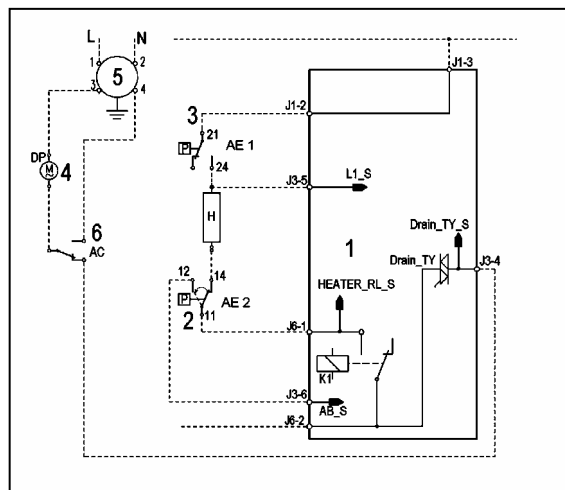
1. PCB
2. Anti-boiling pressure switch AE2
3. Anti-boiling pressure switch AE1
4. Drain pump



## 9.12 Aqua Control

The Aqua Control system is a sensor located in contact with the base frame. The sensor detects water leaks inside the machine (not only during normal operation, but also when the unit is off and plugged in) and starts the drain pump if a leak occurs.

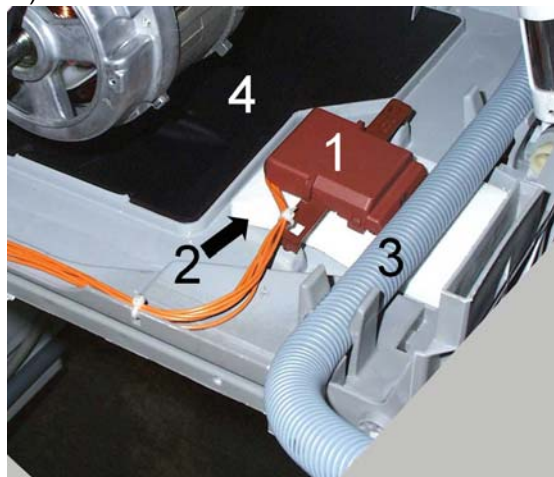
1. Main board
2. Anti-boiling pressure switch AE2
3. Anti-boiling pressure switch AE1
4. Drain pump
5. Interference filter
6. Aqua Control



Besides supporting the various components on the appliance (drain pump, recirculation pump, shock absorbers, etc.), the base frame is designed to be a container that collects any water leaks that may occur (from the drum, from a tube or pipe, etc.). These leaks are directed into an area where a float is installed. When this float is raised by water, it actuates a microswitch that starts the drain pump. When the switch is tripped, an alarm is also signalled (if the machine is switched on).

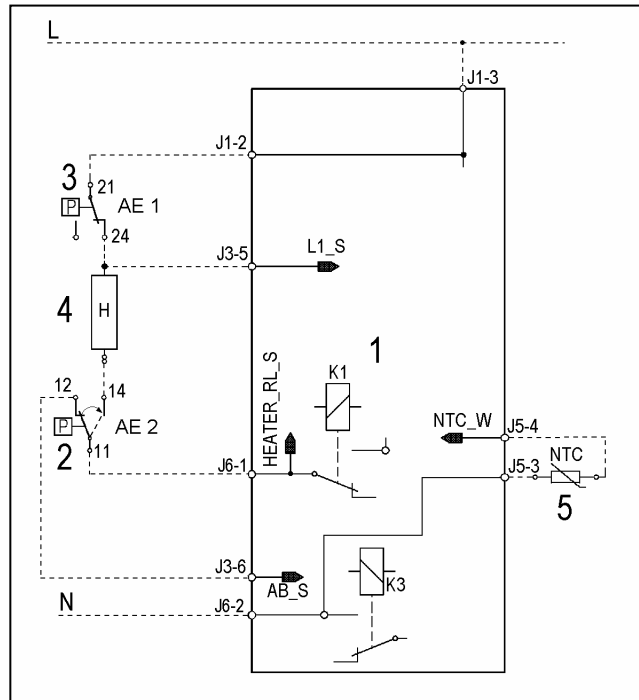
**Important:** When replacing the drain pump or tube, arrange the tube so that it doesn't interfere with the float.

1. microswitch actuated by float
2. float
3. drain tube
4. cover



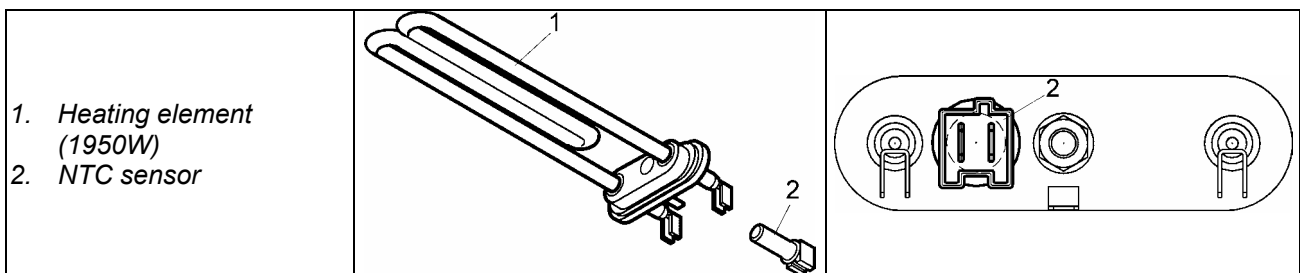
## 9.13 Heating system

1. Main board
2. Anti-boiling pressure switch AE2
3. Anti-boiling pressure switch AE1
4. Heating element
5. NTC temperature sensor



The heating element is powered by a relay on the main board through the contacts on the pressure switches, which must be closed on “full”.

### 9.13.1 Heating element



### 9.13.2 Temperature sensor

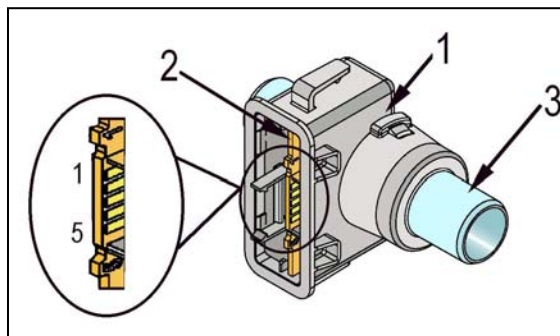
The temperature is controlled by the main board using an NTC temperature sensor.

TEMPERATURE (°C)	RESISTANCE (Ω)		
	Nominal value	Maximum value	Minimum value
20	6050	6335	5765
60	1250	1278	1222
80	640	620	660

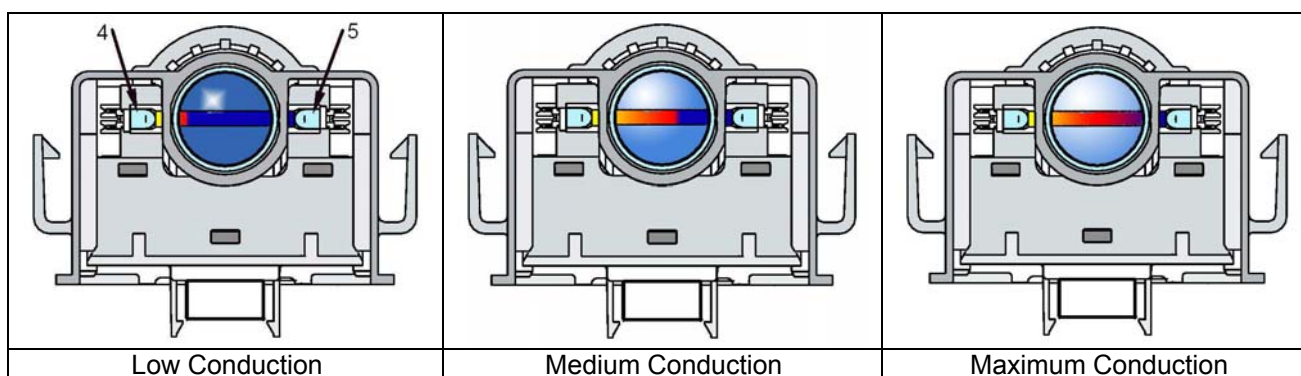
## 9.14 Turbidity sensor

This sensor is installed only on machines equipped with a recirculation pump.

1. *Housing*
2. *Electronic circuit*
3. *Transparent tube*



The sensor consists of a transparent tube installed in the water circulation circuit. A diode (4) on the side of the tube emits infrared rays (at a frequency of 2.3 KHz, as generated by the electronic circuit) and a phototransistor (5) on the other side of the tube is hit by the rays. The amount of current conducted by the phototransistor depends on how clear the water is: the clearer the water, the more current the phototransistor conducts and, as a result, the higher the voltage output from the electronic circuit.



The turbidity sensor operates during the Whites and Colours programmes (COTTON). It does not operate during the 60°C and 40°C Energy Saving programmes and the Night cycle.

The sensor is calibrated at the end of the wash cycle.

The sensor detects the turbidity of the water at the end of the first rinse and again at the beginning of the second rinse. The relationship between the two measurements is compared with values programmed on the board, and the result of the comparison determines whether another rinse is carried out.

## 9.15 Motor

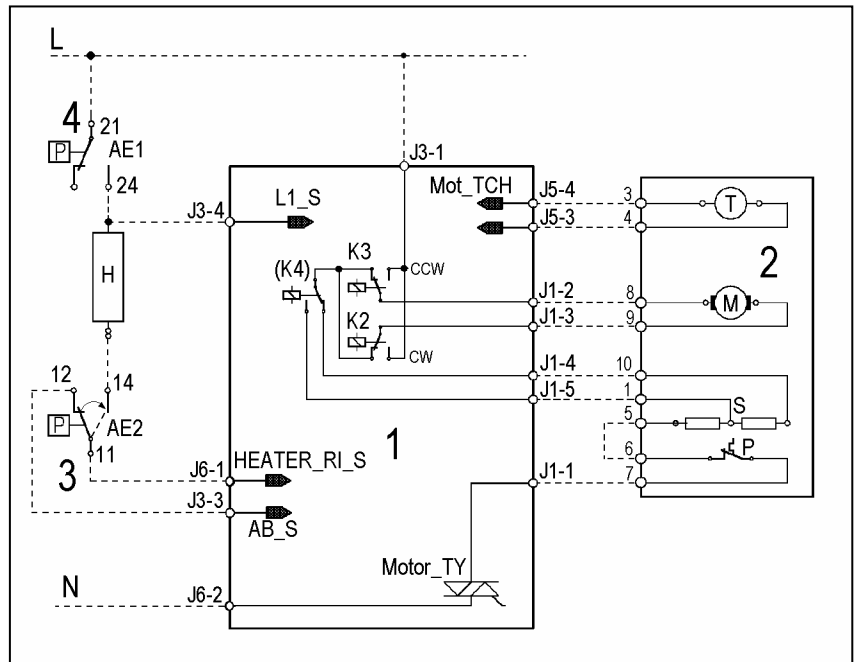
1. PCB
2. Motor
3. Anti-boiling pressure switch AE1
4. Anti-boiling pressure switch AE2

*M* = rotor

*P* = motor safety cut-out

*S* = stator

*T* = tachometric generator



## 9.16 Power supply to motor

The PCB powers the motor via a triac. The direction of rotation is reversed by switching of the contacts on the two relays (K2-K3), which modify the connection between the rotor and the stator.

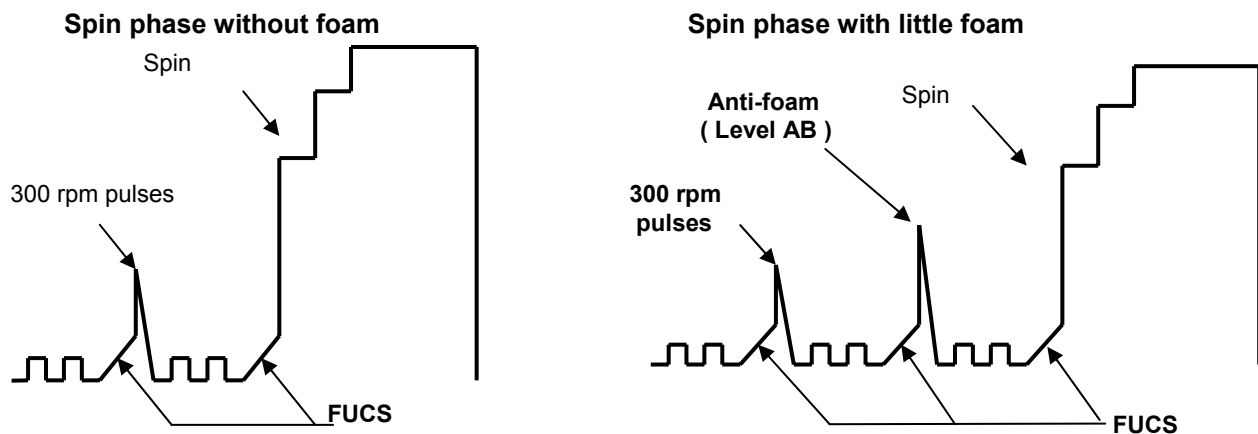
In certain models (1200-1600rpm), a third relay (K4) is used to power the stator (full or half field) according to the spin speed

The speed of rotation of the motor is determined by the signal received from the tachometric generator.

During the spin phases, the microprocessor, depending on the software configuration, may perform the anti-foam control procedure (if featured) and the anti-unbalancing control procedure.

## 9.17 Anti-foam control system

The anti-foam control procedure (if featured) is performed via the anti-boiling pressure switch (AB).

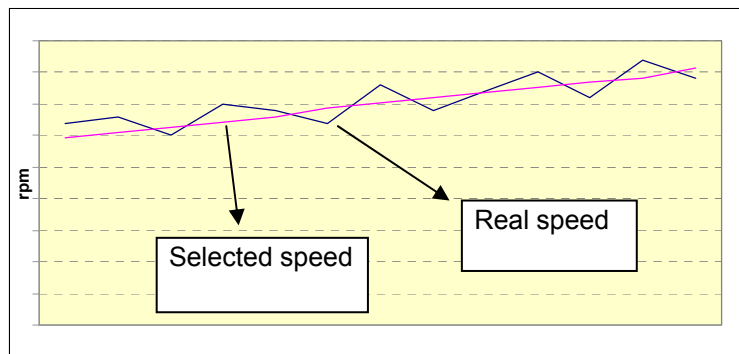


- **Spin with little foam:** if the contact of pressure switch AB closes on FULL, the spin phase is interrupted; the drain pump continues to operate and, when the contact returns to EMPTY, the spin phase is resumed.
- **Spin with excessive foam in the tub (critical situation):** The control system detects whether the pressure switch commutates 5 times to FULL. In this case, the spin phase is skipped, and a one-minute drain cycle is performed with the motor switched off; in the case of a washing phase, a supplementary rinse is added.

## 9.18 “FUCS” (Fast Unbalance Control System)

The control procedure for unbalanced loads is performed dynamically, before each spin cycle, as follows:

- ↪ The phase begins at a speed of 55 rpm; the speed can never fall below this threshold, otherwise the check is repeated.
- ↪ At intervals of 300 ms, the balance is calculated and compared with predetermined limits. If the value is less than the lower limit, the speed of the drum is increased by a certain value depending on the transmission relation between motor pulley/drum; if the unbalancing is higher, it is decreased by the same value. The reduction in the speed of the drum distributes the washing correctly; this procedure is repeated until the wash load is completely balanced.
- ↪ Correct balancing of the wash load is achieved at a speed of 115 rpm, after which the spin cycle begins.



The Unbalancing Control function takes place in different phases: each phase is characterized by:

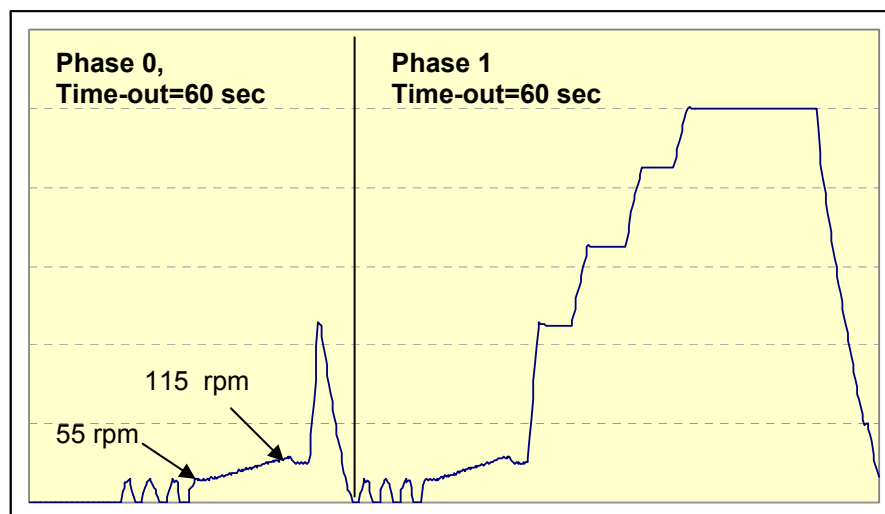
- ↪ *an unbalancing index (0-1-2-3)*
- ↪ *an unbalancing threshold value (ex: 350, 650, 850, 1200rpm)*
- ↪ *a time out (max. time)*

- **Ending of the FUCS balancing phase**

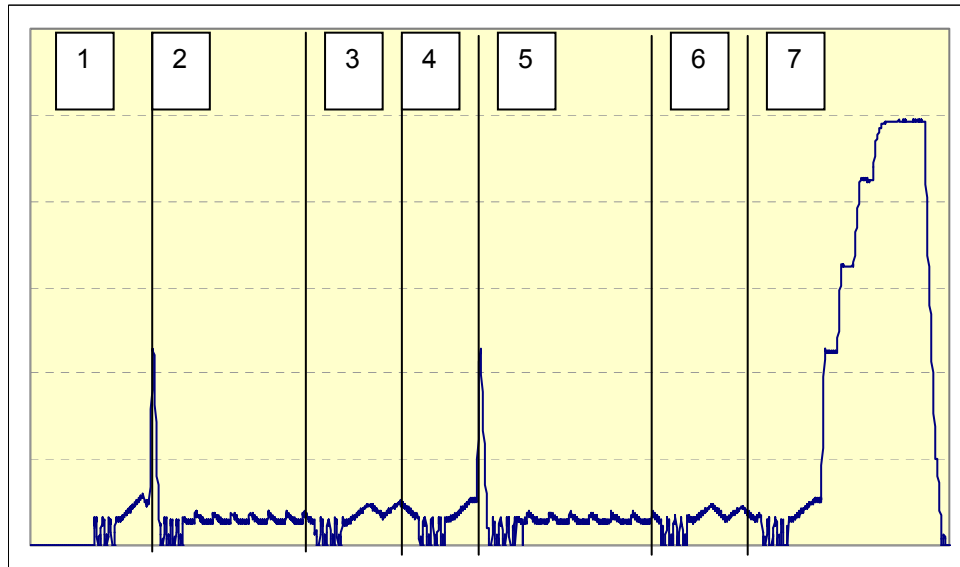
The phase is ended when:

- ↪ The drum rotation speed is 115 rpm (or 85rpm in some cases of unbalancing index). In this case the spin is performed.
- ↪ In some cases the optimal balancing value is not reached: a reduced spin is performed depending on the unbalancing.
- ↪ In the worst case, in which all phases are not sufficient to reach a minimum balancing value, the spin is not performed.

- **Example of perfect balancing**



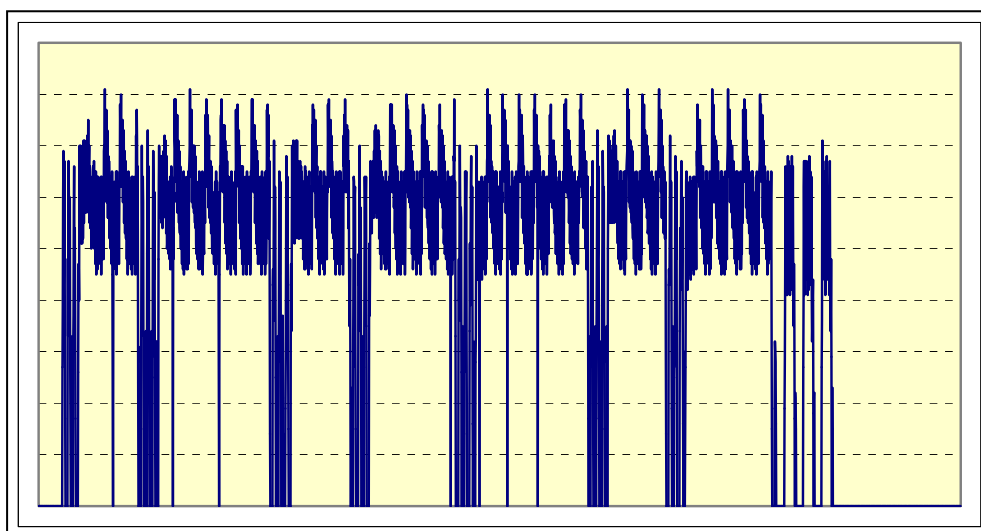
- **Balancing in the available longer interval**



Phase	Unbalancing index	Time-out (sec)
1	0	60
2	1	120
3	2	60
4	3	90
5	1	120
6	2	90
7	3	90

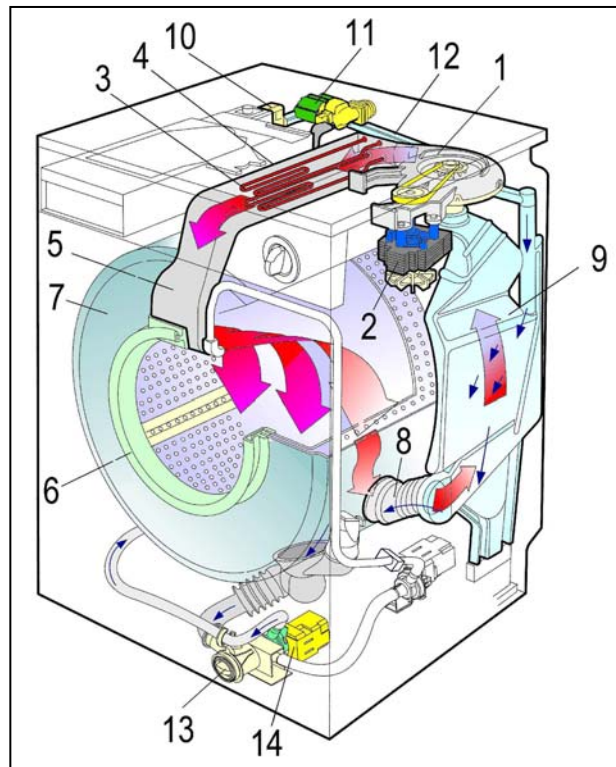
- **Unbalancing after all phases**

In this case the spin (or impulse) is not performed.



## 10 DRYING CIRCUIT

1. Fan
2. Fan motor
3. Drying heater
4. Heater casing
5. Duct
6. Door seal
7. Tub
8. Tube from tub to condenser
9. Drying condenser
10. Coupling
11. Water fill solenoid
12. Condenser water intake and steam vent tube
13. Drain filter
14. Drain pump



**Automatic drying cycles:** the drying time is governed by the microprocessor so that the desired degree of dryness is achieved.

The drying cycle can be performed at the end of the washing cycle, or as a separate programme. Various types of drying can be selected:

- extra-dry
- cupboard-dry
- iron-dry

**Time-controlled cycle:** the drying time is selected by the user (maximum 130 minutes for cotton and synthetic fabrics).

**Cooling:** a cooling cycle is performed at the end of every drying cycle.

**The drying heaters** are powered directly by the main board via two relays and the contacts of the safety pressure switch.

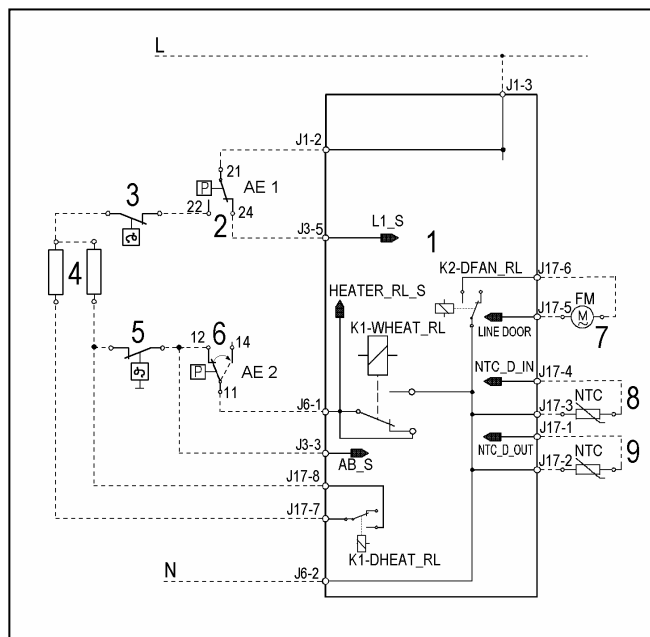
In cycles for synthetic fabrics, drying is performed with only one heater switched on (half power); in cotton/linen cycles, both the heaters are switched on (full power).

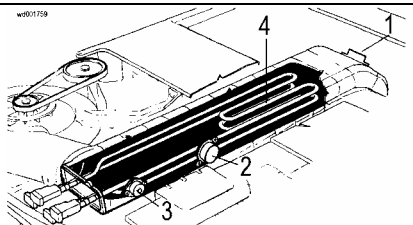
**The fan motor** is powered via a relay; the **condensation solenoid** is powered by a triac.

## 10.1 Temperature control

The drying temperature is controlled by an NTC sensor positioned on the duct. The heater casing features two safety thermostats (one of which is a manual-reset type).

1. Circuit board
2. Anti-boiling pressure switch AE1
3. Safety thermostat (auto-reset)
4. Drying heater
5. Safety thermostat (manual reset)
6. Anti-boiling pressure switch AE2
7. Fan motor
8. Drying control sensor (NTC)
9. Humidity control sensor (NTC)

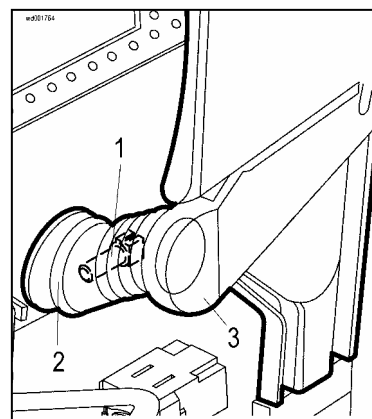


<ol style="list-style-type: none"> <li>1. Drying temperature control thermostat (NTC)</li> <li>2. Safety thermostat (auto reset)</li> <li>3. Manual-reset safety thermostat (150°C)</li> <li>4. Drying heater</li> </ol>			
<b>NTC sensor: resistance at 25°C</b>		5000Ω	
<b>Manual-reset safety thermostat</b>		Normally closed Opens at 150°±5°C	
<b>Auto-reset safety thermostat</b>		Normally closed Opens at 110°±3°C Closes at 94°±5°	
<b>Heater group</b>	<b>Power</b>	920+920 W	
	<b>Voltage</b>	230V	240V
	<b>Resistance</b>	56,5Ω+56,5Ω	61,5Ω+61,5Ω
<b>Fan capacity</b>		80 m <sup>3</sup> – hour	

### Calculating the drying time:

In automatic cycles, the NTC sensor fitted to the drying condenser is used to calculate the drying time.

1. NTC temperature sensor
2. Tube from tub to condenser
3. Drying condenser

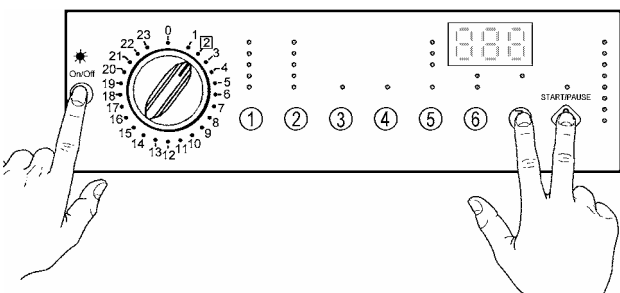
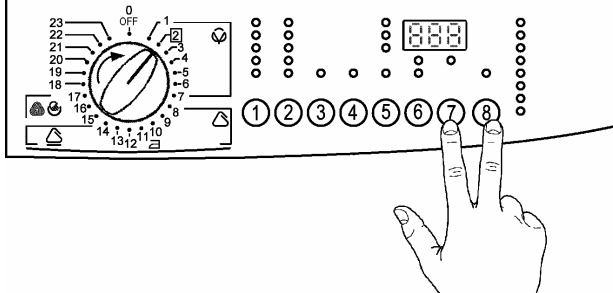


## 11 DEMO Mode

A special cycle has been created for demonstration of the operation of these appliances in retail outlets without connecting the appliance to the water supply. In this way, the salesman can select any programme; after starting the cycle by pressing START, the appliance will perform certain phases only, and will skip those which cannot be performed (water fill, drain, heating).

The cycle takes place as follows:

- ↪ the door locking device is actioned in the normal way (i.e. the door remains locked while the appliance is in operation, and can be opened at the end of the cycle or in pause mode)
- ↪ motor: all low-speed movements are enabled, while the pulse signals and the spin cycle are excluded
- ↪ the water fill solenoids and the drain pump are disabled
- ↪ display: since the phases of the cycle take place in rapid succession (1 second of the demo cycle is equivalent to 1 minute of the actual cycle), the time-to-elapsed decreases by 1 unit per second. Remember that the time-to-elapsed does not always correspond to the actual cycle time
- ↪ alarms: for reasons of safety, the following groups of alarms remain enabled: E40 (door closed), E50 and E90 (communication between the boards/configuration).

Version with ON/OFF button	Version with ON/OFF button incorporated in the selector
	
<ol style="list-style-type: none"> <li>1. Cancel the set programme and switch the appliance off.</li> <li>2. Rotate the programme selector of <b>two positions clockwise</b>.</li> <li>3. Press the <b>start/pause</b> (8) button and any of the option button simultaneously and then, keeping them pressed, <b>switch the appliance on</b> through the ON/OFF button (on/off).</li> <li>4. Hold the start/pause and option buttons down till the LEDs start flashing (about 5 seconds).</li> </ol>	<ol style="list-style-type: none"> <li>1. Cancel the set programme switching the appliance off.</li> <li>2. Press the <b>start/pause</b> (8) button and any of the option button simultaneously and then, keeping them pressed, <b>switch the appliance on</b> rotating the programme selector of <b>two positions clockwise</b>.</li> <li>3. Hold the start/pause and option buttons down till the LEDs start flashing (about 5 seconds).</li> </ol>

*Attention: the programme selector is not always in the position indicated in the picture; it can be on the right or on the left of the display board.*

The time needed to perform a cycle in DEMO MODE depends on the programme chosen.

### 11.1 Exiting demo mode

- ↪ Switch the appliance off to exit the demo mode.

## 12 DIAGNOSTICS SYSTEM

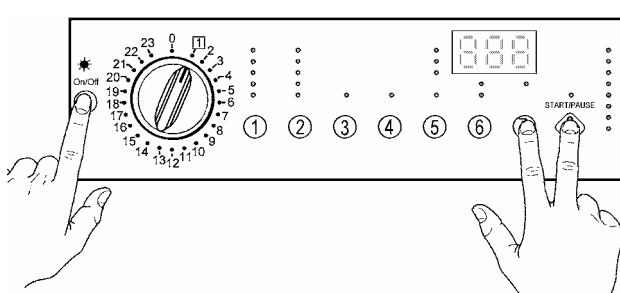
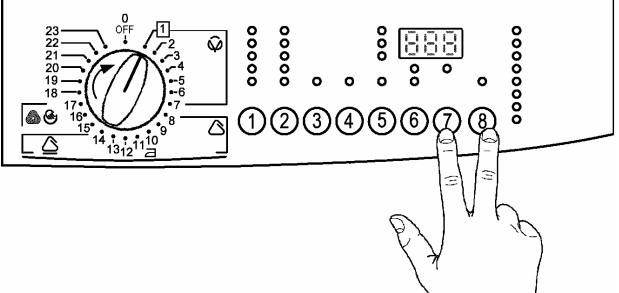
### 12.1 Access to diagnostics system

Using a single procedure, it is possible to access to the diagnostics system. After accessing this function, the following operations can be performed:

- control of the operation of each of the components in the appliance
- read / cancel the alarms

The diagnostics cycles are available only if the communication between the main PCB and the display board is correct; moreover there should not be configuration errors of the appliance.

**To access:**

Version with ON/OFF button	Version with ON/OFF button incorporated in the selector
	
<ol style="list-style-type: none"><li>5. Cancel the set programme and switch the appliance off.</li><li>6. Rotate the programme selector of <b>one position clockwise</b>.</li><li>7. Press the <b>start/pause</b> (8) button and any of the option button simultaneously and then, keeping them pressed, <b>switch the appliance on</b> through the ON/OFF button (on/off).</li><li>1. Hold the start/pause and option buttons down till the LEDs start flashing (about 5 seconds).</li></ol>	<ol style="list-style-type: none"><li>4. Cancel the set programme switching the appliance off.</li><li>5. Press the <b>start/pause</b> (8) button and <b>any</b> of the option buttons simultaneously and then, keeping them pressed, <b>switch the appliance on</b> rotating the programme selector of <b>one position clockwise</b>.</li><li>1. Hold the start/pause and option buttons down till the LEDs start flashing (about 5 seconds).</li></ol>

*Attention: the programme selector is not always in the position indicated in the picture; it can be on the right or on the left of the display board!*

In the first position the function test of the buttons and the corresponding LEDs is performed; by rotating the programme selector **clockwise** the operation diagnostics of each component and the reading of the alarms is carried out.

### 12.2 Exiting diagnostics system

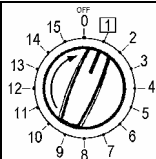
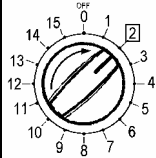
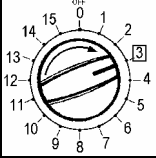
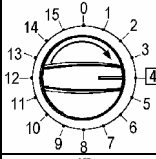
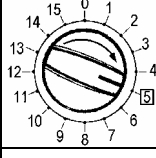
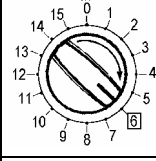
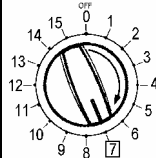
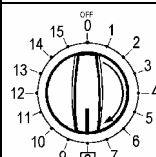
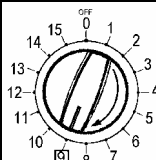
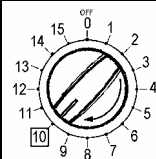
↳ To exit the diagnostics system switch the appliance off, on and then off again.

### 12.3 Phases of the diagnostics test

Independently of the type of selector, after activating the diagnostics system, the operation diagnostics of the different components and the reading of the alarms can be performed, by rotating the selector **clockwise**.

In models with digit the code of the selector position is displayed for a second.

In the diagnostics cycle all alarms are activated. If during the cycle operation an alarm occurs, the appliance blocks and the LEDs (and the display) flash indicating the relative code.

Diagnostics phases					
Selector position		Components actioned	Operating conditions	Function checked	Displayed parameters (1)
1		All the LEDs light in sequence. When a button is pressed, the corresponding LED lights (and the buzzer, if featured, sounds)	Always activated	Operation of the user interface	Button codification
2		Door interlock Washing solenoid	Door locked Water level below anti-flooding level Maximum time 5 minutes	Water ducted through washing compartment	(**) Selection position code
3		Door interlock Pre-wash solenoid	Door locked Water level below anti-flooding level Maximum time 5 minutes	Water ducted through pre-wash compartment (bleach)	(**) Selection position code
4		Door interlock Pre-wash and wash solenoids	Door locked Water level below anti-flooding level Maximum time 5 minutes	Water ducted through conditioner compartment	(**) Selection position code
5		Door interlock. Bleach/stains solenoid.	Door locked Water level below anti-flooding level Maximum time 5 minutes	Water ducted through bleach/stains compartment	(**) Selection position code
6		Door interlock Washing solenoid if the level of water in the tub is below 1st level Heating element.	Door locked. Water at 1st level. Maximum time 10 min. or up to 90°C. (*)	Heating	(**) Selection position code
7		Door interlock. (Washing solenoid if the level of water in the tub is below 1st level). Motor (55 rpm clockwise, 55 rpm counter-clockwise, 250 rpm impulse)	Door locked Water level at 1st level.	Check for leaks from the tub	(**) Selection position code
8		Door interlock Drain pump Motor up to 650 rpm then at maximum spin speed	Door locked Water level lower than anti-boiling level for spinning	Drain and spin; control of congruence in closure of level pressure switches	(**) Selection position code
9		Drying heater Fan Condensation solenoid Drain pump Motor	Door closed	Drying	(**) selector position code
10		Reading/cancelling last alarm	---	---	Alarm code
11, 12 ...24		All LEDs light in sequence. Pressing a button the corresponding LED lights (and the Buzzer sounds, if featured)			

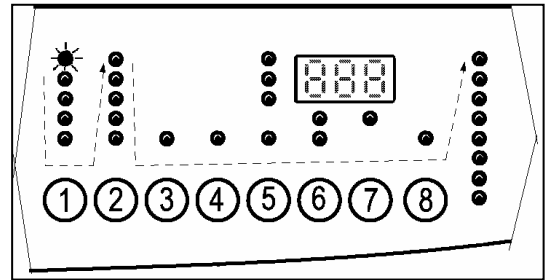
(\*) This time is usually long enough for checking the heating system. The time can be increased by repeating the phase without draining the water; to accomplish this, momentarily select another diagnostic phase and then reselect the heating test (if the temperature exceeds 80°C, the heating test will not be performed).

(\*\*) See table, page 54

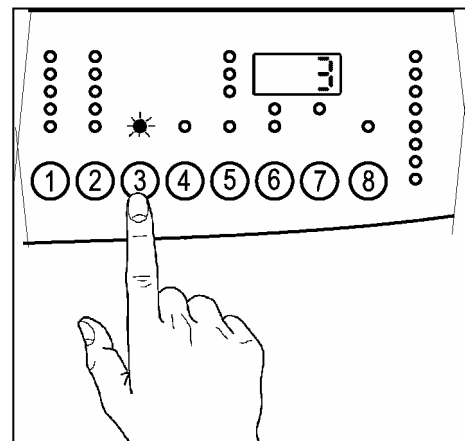
(1) Models with display.

### 12.3.1 Display board diagnostics

After entering the diagnostics system, the display board is checked: all LEDs and the display light in sequence (if featured).



Pressing all buttons, the corresponding LEDs switch on or those closer; the display shows the hexadecimal code corresponding to the button codification.



### 12.3.2 Programme selector

In the table are indicated the closures between the contact C6 (common) and the other contacts (C1–C5) of the programme selector in the different positions and the corresponding codification. The code is displayed only in the appliances with display.

Selector position		Closure of selector contacts (C6 is the common)					Display code
Type 24 positions	Type 12 positions (C1 is not featured)	C1	C2	C3	C4	C5	
1 - Cancel	1 - Cancel	0	1	1	1	1	1 E
2	2	0	1	0	0	1	0 6
3	-	0	1	1	0	0	1 4
4	3	0	1	0	1	0	0 C
5	-	0	1	1	1	0	1 C
6	4	0	0	0	1	1	0 A
7	-	1	0	0	0	0	0 1
8	-	1	0	0	0	1	0 3
9	-	1	0	0	1	0	0 9
10	5	0	1	0	1	1	0 E
11	6	0	0	1	0	1	1 2
12	-	1	0	0	1	1	0 b
13	-	1	0	1	0	0	1 1
14	7	0	0	1	1	0	1 8
15	-	1	0	1	0	1	1 3
16	8	0	0	1	1	1	1 A
17	-	1	0	1	1	0	1 9
18	-	1	0	1	1	1	1 b
19	-	1	1	0	0	0	0 5
20	9	0	1	1	0	1	1 6
21	-	0	0	0	0	1	0 2
22	10	0	1	0	0	0	0 4
23	11	0	0	0	1	0	0 8
24	12	0	0	1	0	0	1 0

Selector position		Closure of selector contacts (C6 is the common)					Display code
Type 16 Positions (C1 is not featured)		C1	C2	C3	C4	C5	
1 - Cancel		0	1	1	1	1	1 F
2		0	1	0	0	1	0 7
3		0	1	1	0	0	1 5
4		0	1	0	1	0	0 D
5		0	0	0	1	1	0 B
6		0	1	0	1	1	0 F
7		0	0	1	0	1	1 3
8		0	0	1	1	0	1 9
9		0	0	1	1	1	1 B
10		0	1	1	0	1	1 7
11		0	1	1	1	0	1 D
12		0	0	0	0	0	0 1
13		0	1	0	0	0	0 5
14		0	0	0	1	0	0 9
15		0	0	0	0	1	0 3
16		0	0	1	0	0	1 1

1= This code is shown on the display

## 13 ALARMS

### 13.1 Displaying the alarms to the user (for appliances with Display)

Control of the alarm system can be configured; according to the model, therefore, some or all of the alarms may be displayed to the user.

Normally all the alarms are displayed to the user except for:

- E10 – Water fill difficulty
- E20 – Drain difficulty
- E40 – Relative to the door lock
- E90 – Relative to the configuration

**The alarms are active during the execution of the washing programme; except for the alarms relative to the configuration and power/frequency supply which are displayed also in the selection phase.**

The door can normally be opened (except where specified) when an alarm condition has occurred on condition that:










- The level of the water in the tub is under a level which depends on the configuration of the appliance.
- The temperature of the water is lower than 55°C

Certain alarm conditions require that a drain phase be performed before the door can be opened:

- Cooling water fill if the temperature is in excess of 65°C
- Drain until the pressure switch is on empty, during a max. 5 minute time.

#### 13.1.1 Alarms displayed during normal operation

The type of alarm condition is displayed to the user by the repeated flashing of the END OF CYCLE LED (0.4 seconds lit, 0.4 seconds off, with an interval of 2.5 seconds between sequences). This LED is featured on ALL MODELS, though configured in different positions.

<p>If, for example, the user should forget to close the door, the control system will detect alarm E41 about 15 seconds after the start of the cycle; the cycle remains in PAUSE mode and the display, if featured, would display E40.</p> <p>Simultaneously the LED end-of-cycle flashes repeating the sequence indicated in the table.</p> <p>The four flashing indicate the first of the two digits of the alarm <b>E41</b> (the alarms relative to a same function are grouped by families).</p> <p>In this case, once the door has been closed, it is sufficient to press the start button to start the programme.</p>	LED end of cycle		→
	On/Off	Time (Sec.)	Value
		0.4	1
		0.4	
		0.4	2
		0.4	
		0.4	3
		0.4	
		0.4	<b>4</b>
		0.4	
		2.5	Pause between sequences

## 13.2 Reading the alarm codes

In order to read the last alarm code memorized in the EEPROM on the PCB:

- Enter diagnostics mode
- Irrespective of the type of PCB and configuration, turn the programme selector **clockwise** to the **tenth position**.

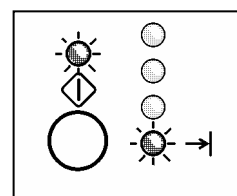
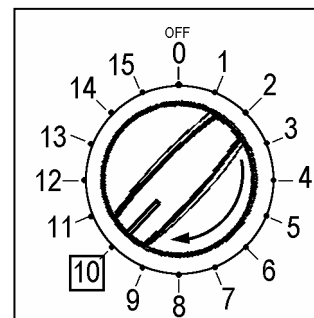
### 13.2.1 Displaying the alarm

The alarm is displayed by a repeated flashing sequence of the two LEDs (0.4 seconds lit, 0.4 seconds off, with an interval of 2.5 seconds between sequences).

*The buzzer (if featured) will sound “bips” in synchronization with the flashing of the LEDs.*

- **END OF CYCLE LED** → indicates the first digit of the alarm code (family)
- **START/PAUSE** → indicates the second digit of the alarm code (number within the family)

These two LEDs are featured on all models (though they are **configured differently**), and flash simultaneously.



Notes:

- The first letter of the alarm code “**E**” (Error) is not displayed, since this letter is common to all alarm codes.
- The alarm code “families” are shown in hexadecimal; in other words:
  - **A** is represented by 10 flashes
  - **B** is represented by 11 flashes
  - ...
  - **F** is represented by 15 flashes
- Configuration errors are shown by the flashing of a series of LEDs.

### 13.2.2 Examples of alarm displays

Example: Alarm E43 will display the following:

- On the display, if featured, **E43**
- The sequence of **four** flashes of the **End-of-cycle LED** indicates the first number E**4**3;
- The sequence of **three** flashes of the **Start/Pause LED** indicates the second number E4**3**;

END-OF-CYCLE LED →			START/PAUSE LED ⬇		
On/Off	Time (Sec.)	Value	On/Off	Time (Sec.)	Value
	0.4	1		0.4	1
	0.4			0.4	
	0.4	2		0.4	2
	0.4			0.4	
	0.4	3		0.4	<b>3</b>
	0.4			0.4	
	0.4	<b>4</b>		3,3	Pause
	0.4				
	2.5	Pause			

### 13.2.3 Operation of alarms during diagnostics

All alarms are enabled during the components diagnostics phase. Moving the selector to pass from one control phase to the other, the appliance exits the alarm condition and performs the selected phase (if the alarm does not occur again).

### 13.3 Notes about some alarms

- **Configuration alarms**
- ↵ **E91:** the error is indicated by the flashing of all LEDs, E90 is displayed on the display, if featured.
- ↵ **E92:** the error is indicated by the flashing of LEDs placed over the buttons, E90 is displayed on the display, if featured.
- ↵ **E93:** the error is indicated by the flashing of the phase/warning LEDs, E90 is displayed on the display, if featured.
- ↵ **E95:** the error is indicated by the flashing of all LEDs, E90 is displayed on the display, if featured.
- ↵ **EB1-EB2-EB3 alarms:** in case of problems with the power supply, the machine remains in alarm condition till the frequency or the power supply voltage returns to correct values or the appliance is switched off. “**EB0**” alarm family is displayed and it is not possible to enter the diagnostics or to use “alarm fast display” mode: the alarm complete can be read only when the abnormal situation terminated.

### 13.4 Rapid reading of alarm codes

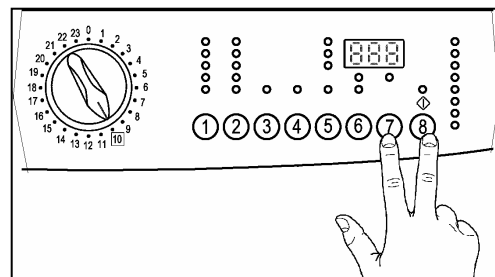
The last alarm code can be displayed even if the programme selector is not in the tenth position (diagnostics) or if the appliance is in normal operating mode (e.g. during the execution of the washing programme):

- ↵ Press and hold down **START/PAUSE** and the option button nearest to the START/PAUSE button for at least two seconds: the LEDs initially switch off, and then display the flashing sequence corresponding to the alarm or the code on the display or a message on LCD.
- ↵ The alarm sequence is displayed for the time in which the buttons are hold down
- ↵ The reading system is the same as that indicated in paragraph. 13.2
- ↵ During the time the alarm is displayed, the appliance continues to perform the cycle or, if it is in the selection phase, it keeps in memory the options previously chosen.

### 13.5 Cancelling the last alarm with LEDs

It is good practice to cancel the last alarm, after reading the alarm code to check whether the alarm re-occurs during the diagnostics control after the reparation of the appliance.

1. Select diagnostics mode and turn the programme selector to the **tenth** position (reading of alarm)
2. Press the **START/PAUSE** and its nearest option button simultaneously.
3. Hold down the START/PAUSE and option buttons (about 5 seconds).



### 13.6 Table of alarm codes

Alarm	Description	Possible fault	Action/machine status	Reset
E11	Poor water fill before wash cycle	Tap closed or water pressure too low; Drain tube improperly positioned; Water fill solenoid valve is defective; Leaks from water circuit on pressure switch; Pressure switch defective; Wiring defective; Main board defective.	Cycle is paused with door locked	Start
E12	Difficulty in water fill during drying (maximum time 3 min. water fill in drying during the wash load unrolling phase)	Tap closed or water pressure too low; solenoid valve; pressure switch water circuit; pressure switches; wiring; main board.	Cycle is paused	Start
E13	Water leaks	Drain tube improperly positioned; Water pressure too low; Water fill solenoid valve is defective; Water circuit on pressure switch is leaking/clogged; Pressure switch defective.	Cycle is paused with door locked	Start
E21	Poor draining	Drain tube kinked/clogged/improperly positioned; Drain filter clogged/dirty; Drain pump defective; Pressure switch defective; Wiring defective; Main board defective; Electrical current leak between heating element and ground.	Cycle is paused	Start
E22	Difficulty in water fill during drying or drying condenser clogged (anti-boiling pressure switch closed on "FULL")	Drain hose kinked; filter clogged; drying condenser clogged; drain pump faulty; pressure switches faulty; wiring; main circuit board defective; current leakage between heater and ground.	Cycle is paused	Start
E23	Defective triac for drain pump	Drain pump defective; Wiring defective; Main board defective.	Emergency drain procedure - Cycle stops with door unlocked	OFF/reset
E24	Malfunction in sensing circuit on triac for drain pump	Main board defective.	Emergency drain procedure - Cycle stops with door unlocked	OFF/reset
E31	Malfunction in pressure switch circuit (frequency of signal from pressure switch out of limits)	Pressure switch; Wiring; Main board;	Cycle stops with door locked	OFF/reset
E32	Electronic pressure switch improperly calibrated (level on electronic pressure switch differs from 0-66 mm after initial calibration drain and when anti-boiling pressure switch is on "empty").	Tap is closed or water pressure is too low; Solenoid valve; Water circuit on pressure switches; pressure switches; Wiring; main board;	Cycle is paused	Start
E33	Inconsistency between level on electronic pressure switch and level on anti-boiling pressure switch 1(fault persists for at least 60 sec.).	Pressure switch defective; Electrical current leak between heating element and ground; Heating element; Wiring defective; Main board defective. Water circuit;	Emergency drain procedure - Cycle stops with door unlocked	OFF/reset
E34	Inconsistency between level on electronic pressure switch and level on anti-boiling pressure switch 2 (fault persists for at least 60 sec.).	Pressure switch defective; Electrical current leak between heating element and ground; Heating element; Wiring defective; Main board defective. Water circuit;	Emergency drain procedure - Cycle stops with door unlocked	OFF/reset
E35	Overflow	Water fill solenoid valve is defective; Leaks from water circuit on pressure switch; Pressure switch defective; Wiring defective; Main board defective.	Cycle stops. Emergency drain procedure. Drain pump continues to operate (5 min. on, then 5 min. off, etc.).	OFF/reset

Alarm	Description	Possible fault	Action/machine status	Reset
E36	Sensing circuit on anti-boiling pressure switch 1 defective	Main board defective.	Cycle stops with door locked	OFF/reset
E37	Sensing circuit on anti-boiling pressure switch 2 defective	Main board defective.	Cycle stops with door locked	OFF/reset
E38	Internal pressure takeoff is clogged (water level does not change for at least 30 sec. of drum rotation).	Water circuit on pressure switches; Pressure switches; Motor belt broken;	Heating phase is skipped	---
E39	Defective HV sensing on anti-overflow system	Main board defective.	Cycle stops with door locked	OFF/reset
E3A	Faulty sensing by heating resistance relay	Main board defective.	Cycle stops with door locked	OFF/reset
E41	Door unlocked	Door lock unit defective; Wiring defective; Main board defective.	Cycle is paused	Start
E42	Problems closing the door	Door lock unit defective; Wiring defective; Main board defective	Cycle is paused	Start
E43	Defective triac supplying power to door delay system	Door lock unit defective; Wiring defective; Main board defective.	(Emergency drain procedure) Cycle stops	OFF/reset
E44	Defective sensing by door delay system	Main board defective.	(Emergency drain procedure) Cycle stops	OFF/reset
E45	Defective sensing by triac on door delay system	Main board defective.	(Emergency drain procedure) Cycle stops	OFF/reset
E51	Motor power supply triac short-circuited	PCB faulty; current leakage from motor or from wiring.	Cycle blocked, door locked (after 5 attempts)	OFF/reset
E52	No signal from motor tachometric generator	Motor faulty; wiring faulty; PCB faulty	Cycle blocked, door locked (after 5 attempts)	OFF/reset
E53	Motor triac sensing circuit faulty	PCB faulty.	Cycle blocked, door locked	OFF/reset
E54	Motor relay contacts sticking	PCB faulty; current leakage from motor or from wiring	Cycle blocked, door locked (after 5 attempts)	OFF/reset
E61	Insufficient heating during washing	NTC sensor faulty; heating element faulty; wiring faulty; PCB faulty.	The heating phase is skipped	---
E62	Overheating during washing	NTC sensor faulty; heating element faulty; wiring faulty; PCB faulty.	Safety drain cycle – Cycle stopped with door open	OFF/reset
E66	Heating element power relay faulty	PCB faulty; current leakage from heating element to ground.	Safety drain cycle – Cycle stopped with door open	OFF/reset
E71	NTC sensor for wash cycle defective	Defective NTC sensor; Wiring defective; Main board defective.	Heating is skipped	Start
E72	Fault in NTC sensor on drying condenser (voltage out of range = short-circuit, open circuit)	Drying NTC sensor (condenser) defective; wiring defective; main circuit board defective.	Heating is skipped	Start
E73	Fault in NTC sensor on drying duct (voltage out of range = short-circuit, open circuit)	Drying NTC sensor (duct) defective; wiring defective; main circuit board defective.	Heating is skipped	Start
E74	NTC sensor for wash cycle improperly positioned	NTC sensor improperly positioned; Defective NTC sensor; Wiring defective; Main board defective.	Heating is skipped	Start
E82	Error in selector reset position	PCB faulty (Wrong configuration data). Selector, wiring	---	OFF/reset
E83	Error in reading selector	PCB faulty (Wrong configuration data). Selector, wiring	Cycle cancelled	---

Alarm	Description	Possible fault	Action/machine status	Reset
E84	"Sensing" circuit on circulation pump triac faulty (input signal to microprocessor always 0V or 5V)	PCB	Drain, cycle blocked (door open)	OFF/reset
E85	Circulation pump faulty (incongruency between status of "sensing" circuit on circulation pump and status of TRIAC)	Circulation pump; wiring; main PCB	Drain, cycle blocked (door open)	OFF/reset
E91	Communication incongruence between main PCB-display board (versions not compatible)	Wiring faulty; Faulty control/display board Main PCB faulty.	Cycle interrupted	---
E92	Communication incongruence between main PCB-display board (versions not compatible)	Wrong control/display board; Wrong PCB (do not correspond to the model).	Cycle interrupted	---
E93	Incorrect configuration of appliance	Incorrect configuration data; PCB faulty.	Cycle interrupted	OFF/reset
E94	Incorrect configuration of washing cycle	Incorrect configuration data; PCB faulty.	Cycle interrupted	OFF/reset
E95	Communication error between microprocessor and EEPROM	PCB faulty.	Cycle interrupted	OFF/reset
E97	Incongruence between programme selector and cycle configuration	Faulty PCB (Wrong configuration data).	Cycle interrupted	OFF/reset
EB1	Frequency of appliance incorrect	Power supply problems (incorrect / disturbance); PCB faulty.	Cycle interrupted	---
EB2	Voltage too high	Power supply problems (incorrect / disturbance); PCB faulty.	Cycle interrupted	---
EB3	Voltage too low	Power supply problems (incorrect / disturbance); PCB faulty.	Cycle interrupted	---
EC1	Solenoid valve inoperative but flow meter operating	Main board defective, Solenoid valve defective	Cycle stops with door locked (after 5 attempts).	OFF/reset
EC2	Signal from turbidity sensor out of limits	Turbidity sensor defective, Main board defective, Wiring defective	---	Start/reset
EC3	Signal from weight sensor out of limits	Weight sensor defective, Main board defective, Wiring defective	---	Start/reset
EF1	Drain filter blocked (too long drain phase)	Drain tube blocked/kinked/too high; Drain filter dirty/blocked.	Warning displayed at the end of cycle (specific LED)	---
EF2	Overdosing of detergent (too much foam during drain phases)	Excessive detergent dosing; drain tube kinked/blocked; Drain filter dirty/blocked.	(specific LED)	---
EF3	Control water intervention	Water leakage on the base; faulty water control device.	Water drain and cycle blocked	OFF/reset
EF4	No alarm	---	---	---
E00	Drain filter blocked (too long drain phase)	Drain tube blocked/kinked/too high; Drain filter dirty/blocked.	Warning displayed at the end of cycle (specific LED)	---

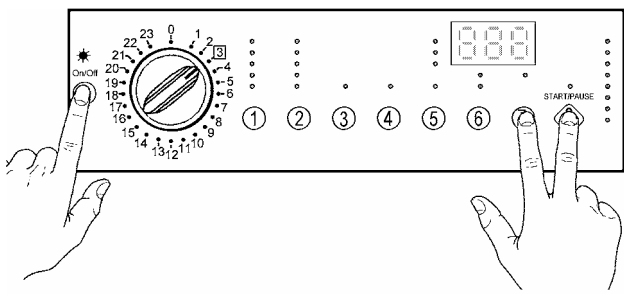
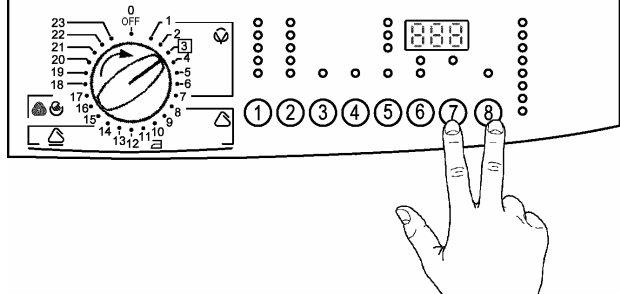
## 14 Operating time counter

It is possible to display, with a specific procedure, the operating time of the appliance, which is counted from the first switching on.

This option is available only in models with display. The maximum memorization capacity is **6550** operating hours.

- Only the operating time of normal programmes is displayed (not diagnostics cycles)
- The actual time of the cycle performed is counted (not the pauses, the delayed start time, rinse hold and the soak phases)
- The memorization is 30 seconds for each programme
- Only operating hours are displayed (1h and 59min = 1h)

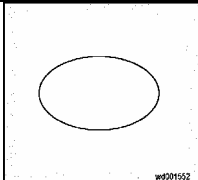
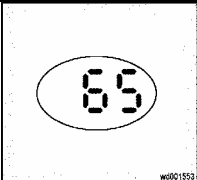
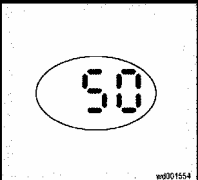
### 14.1.1 Operating time reading

Version with ON/OFF button	Version with ON/OFF button incorporated in the selector
	
<ol style="list-style-type: none"> <li>1. Reset the set programme and switch the appliance off.</li> <li>2. Rotate the programme selector of <b>three positions clockwise</b>.</li> <li>3. Press the <b>start/pause</b> (8) and <b>anyone</b> of the option buttons simultaneously and then, holding the buttons down, <b>switch the appliance on</b> with the ON/OFF button (on/off)</li> <li>4. Keep the start/pause and option buttons down till the LEDs start flashing (about 5 seconds).</li> </ol>	<ol style="list-style-type: none"> <li>1. Cancel the set programme and switch the appliance off.</li> <li>2. Press the <b>start/pause</b> (8) and <b>anyone</b> of the option buttons simultaneously and then, holding the buttons down, switch the appliance on rotating the programme selector of <b>three positions clockwise</b>.</li> <li>3. Keep the start/pause and option buttons down till the LEDs start flashing (about 5 seconds).</li> </ol>

### 14.1.2 Displaying the operating time

The operating time is displayed two digits at a time: the first pair of digits shows the thousands and hundreds; the second pair shows tens and units.

For example, a total operating time of **6,550** hours will be displayed as follows:

1 →	2 →	3 →
Blank display for <u>two seconds</u>	The first pair of digits is displayed for <u>two seconds</u> : - thousands (6) - hundreds (5)	The second pair of two digits is displayed for two seconds: - tens (5) - units (0)
		

## 15 ACCESSING COMPONENTS

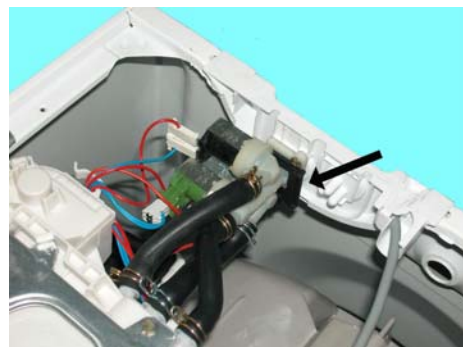
Procedures for accessing specific components on the appliance are described in this section. For information on other procedures, see the general service manual for P6000 washing machines (599 35 23-17)



- The electrical components must be serviced by qualified personnel only
- Unplug the appliance before accessing internal components

### 15.1 Flow meter

If the flow meter malfunctions, the entire solenoid valve assembly must be replaced.

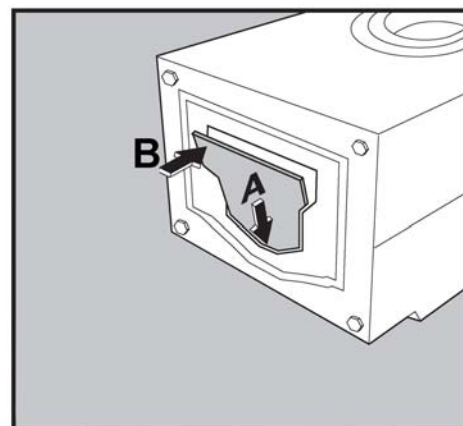


### 15.2 Aqua Control

- ↖ Disconnect the connector.
- ↖ Insert a screwdriver into the holes indicated by the arrows and release the fasteners that attach the component to the base frame.

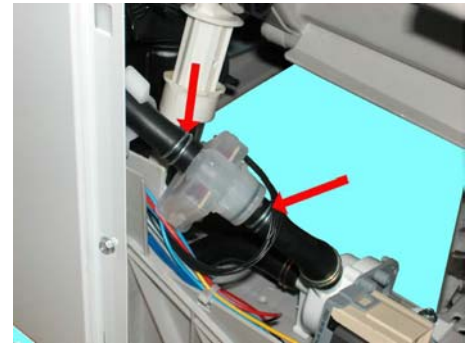


- ↖ To attach the cover onto the base frame:
- ↖ First, slide in the part indicated by the arrow (A), then push the cover in the direction shown by the arrow (B).



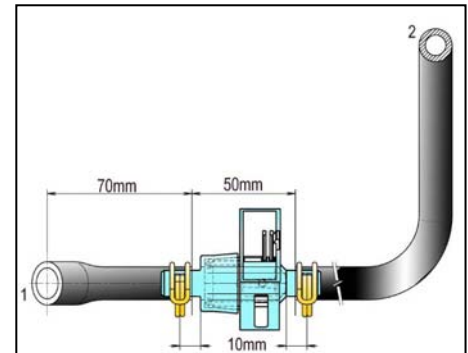
### 15.3 Turbidity sensor

- ↺ Disconnect the connector.
- ↺ Loosen the clamps (shown by the arrows) and remove the tubes from the sensor unit.

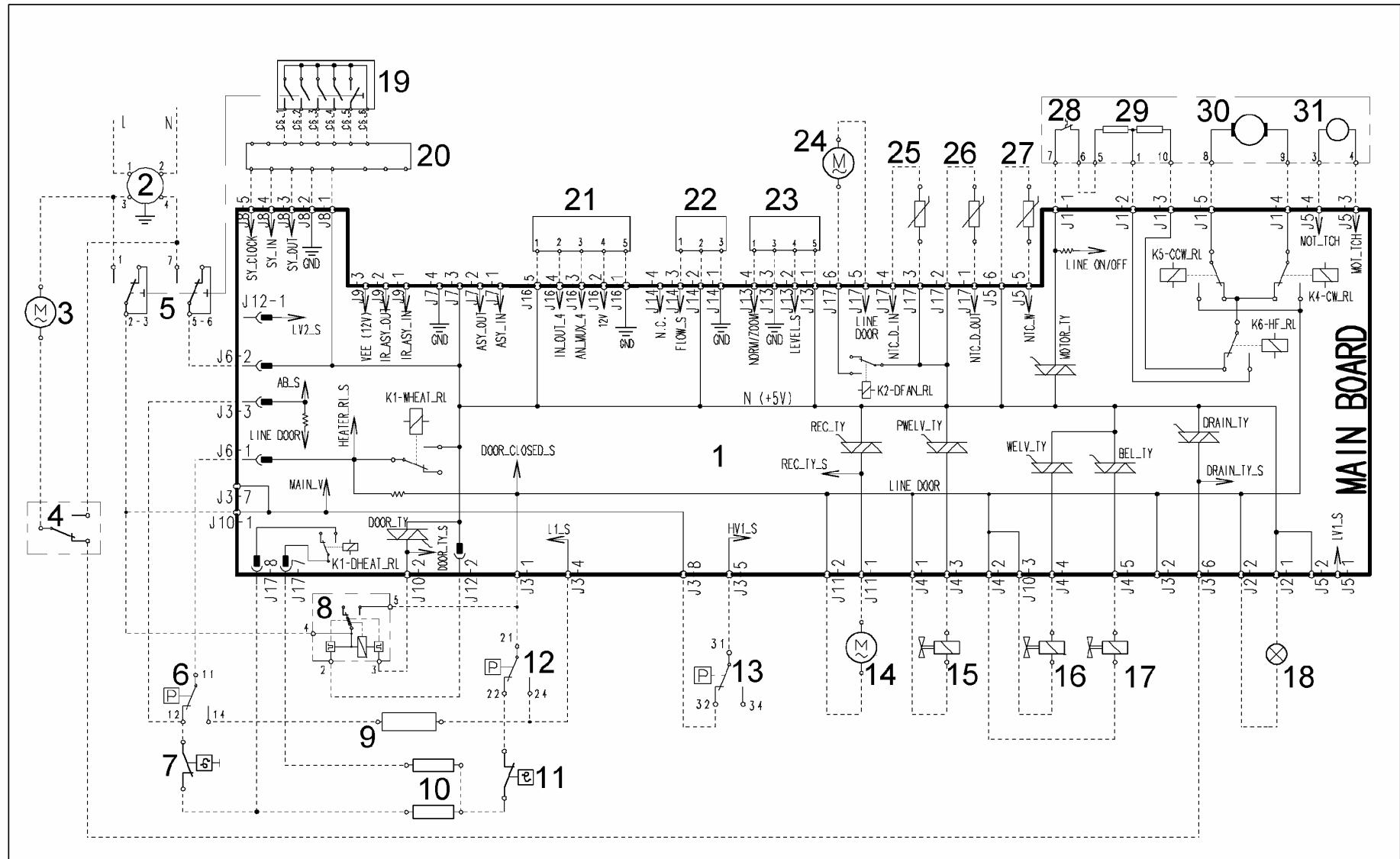


#### 15.3.1 Installing the turbidity sensor

1. *Connection to recirculation pump.*
2. *End that is inserted into the bellows around the door.*



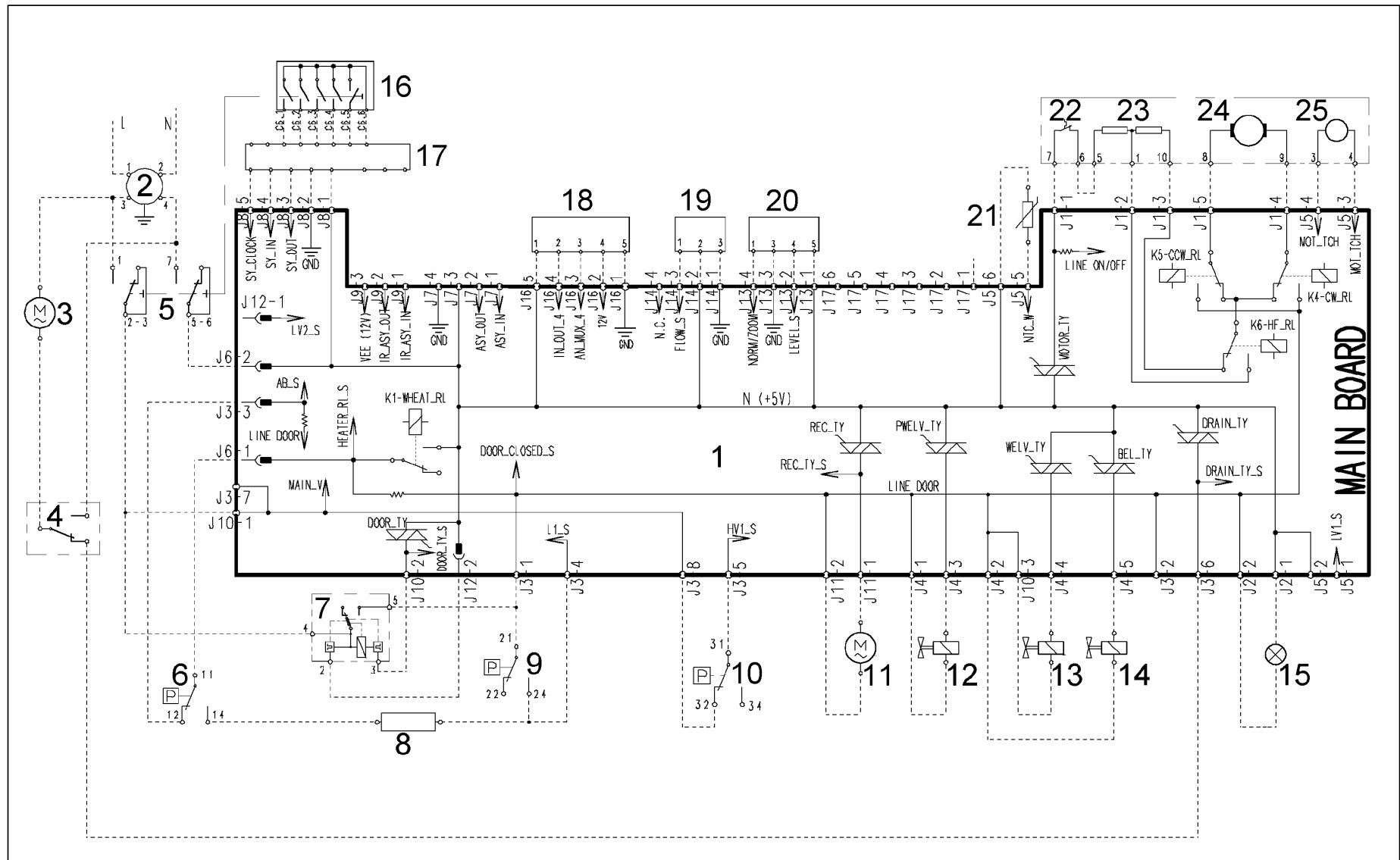
## 16 BASIC CIRCUIT DIAGRAM WD



## 16.1 Key for circuit diagram WD

Electrical components on appliance	Components on main board
1. Main board	BEL_TY Condensation solenoid Triac
2. Interference filter	DOOR_TY Door interlock Triac
3. Drain pump	DRAIN_TY Drain pump Triac
4. Aqua control	REC_TY Recirculation pump Triac
5. ON/OFF switch (built into programme selector)	K1 Heating element relay
6. Anti-boiling pressure switch AE2	K1 Drying heating element relay
7. Manual-reset safety thermostat	K2 Fan motor relay
8. Door lock unit	K4 Motor relay: clockwise rotation
9. Washing heater	K5 Motor relay: anti-clockwise rotation
10. Drying heater	K6 Motor relay: half field power supply ( <i>models with higher spin than 1200 rpm</i> )
11. Auto-reset safety thermostat	MOTOR_TY Motor Triac
12. Anti-boiling pressure switch AE1	PWELV_TY Pre-wash solenoid Triac
13. Anti-overflow pressure switch	WELV_TY Wash solenoid Triac
14. Recirculation pump	
15. Solenoid valve for prewash	
16. Solenoid valve for wash	
17. Solenoid valve for condensation	
18. Pilot lamp	
19. Selector	
20. Control/display board	
21. Turbidity sensor	
22. Flow meter	
23. Analogue pressure switch	
24. Fan motor	
25. NTC temperature sensor (drying)	
26. NTC temperature sensor (humidity)	
27. NTC temperature sensor (washing)	
28. Thermal cut-out (motor)	
29. Stator (motor)	
30. Rotor (motor)	
31. Tachometric generator (motor)	

## 599 36 82-59



## 17.1 Key for circuit diagram WM

Electrical components on appliance	Components on main board
1. Main board	BEL_TY Bleach solenoid Triac
2. Interference filter	DOOR_TY Door interlock Triac
3. Drain pump	DRAIN_TY Drain pump Triac
4. Aqua control	REC_TY Recirculation pump Triac
5. ON/OFF switch (built into selector)	K1 Heating element relay
6. Anti-boiling pressure switch AE2	K4 Motor relay: clockwise rotation
7. Door lock unit	K3 Motor relay: anti-clockwise rotation
8. Heating element	K4 Motor relay: half field power supply ( <i>models with higher spin than 1200 rpm</i> )
9. Anti-boiling pressure switch AE1	MOTOR_TY Motor Triac
10. Anti-overflow pressure switch	PWELW_TY Pre-wash solenoid Triac
11. Recirculation pump	WELV_TY Wash solenoid Triac
12. Pre-wash solenoid valve	
13. Wash solenoid valve	
14. Bleach solenoid valve	
15. Pilot lamp	
16. Selector	
17. Control/display board	
18. Turbidity sensor	
19. Flow meter	
20. Analogic pressure switch	
21. NTC temperature sensor	
22. Thermal cut-out (motor)	
23. Stator (motor)	
24. Rotor (motor)	
25. Tachometric generator (motor)	